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JUNE 1982

LIQUEFIED GAS SHIP SAFETY

Analysis of the Record

1964 to 1981

POTEN & PARTNERS, INC.

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POTEN & PARTNERS, INC.

GAS SHIP SAFETY PERFORMANCE MAINTAINED IN 1981

The characteristically safe performance of gas ships continued in 1981. During the 18-year period for which data exist, there has been no case of cargo spill or leakage resulting from hull or tank damage. There has been no instance of a cargo fire involving either liquefied natural gas (LNG) or liquefied petroleum gas (LPG).

Between 1964 and 1981, LNG and LPG ships (over 5,000 cubic meters) delivered approximately 30,000 cargos, employing 231 vessels of various designs. Fifty-seven incidents involving casualties of a serious nature have been identified during this period. Incidents classed as potentially serious include instances of hull damage, fire anywhere on the ship, and any spill or leakage of cargo. During 1981, potentially serious incidents numbered five, including one collision, two contacts with fixed objects, one engine room explosion, and one engine room fire.

Despite the various hazards of the sea, consequences of these incidents were minimal. Strict design requirements contributed to the limitation and containment of damage. Design specifications for gas ships have been consistently upgraded to achieve improved performance with fewer problems in service. High standards for the selection and training of crews have also been an important factor.

Although LNG and LPG are classified as hazardous cargos, the record shows they have been handled safely in the past. Liquefied Gas Ship Safety: Analysis of the Record 1964-1981 is an update of previous studies by Poten & Partners, Inc.. This publication includes a description of every marine casualty reported for the world fleet of gas ships since 1964, together with a brief statistical analysis.

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June 1982

LIQUEFIED GAS SHIP SAFETY

Analysis of the Record 1964 - 1981

POTEN & PARTNERS, INC.
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TABLE OF CONTENTS

	Page
Summary	1
Overview	2
The Safety Record - LNG Ships	3
The Safety Record - LPG Ships	4
Gas Ships - The Comparative Record	6
Appendix	8
Survey Scope	i
Index of Vessels	ii - x
Reported Casualties (1964-1981)	A-1 - A-73

Summary

How dangerous is the marine transportation of liquefied gases? From time to time concern is expressed over the possible hazards of LNG and LPG shipping. Disaster scenarios have been envisioned whereby a vessel mishap could escalate into an accident of catastrophic proportions. Even though such an occurrence is highly unlikely, it is argued that the potential damage might be unacceptably great.

Nevertheless, it should be kept in mind that these are imaginary marine disasters. A large body of historical data exists on the actual safety performance of liquefied gas ships. The information dates back to 1964 when the data was initially compiled. To the best of our knowledge, every significant gas ship accident over the past eighteen years has been recorded. We believe that a careful examination of the past can provide the best possible guidance as to what could go wrong in the future.

LNG and LPG are both flammable when mixed with air. Thus accidents which result in cargo spill or leakage, or in cargo fire, are potentially the most dangerous. Our analysis indicates only two incidents of cargo spill, neither of which resulted in serious consequences, and no case of cargo fire. These results hold true for 1981, as for preceding years since 1964. Additionally, we find that the safety record for gas ships apparently is superior to that of crude oil tankers over an equivalent period.

Overview

This report is an update of POTEN & PARTNERS' previous studies on Liquefied Gas Ship Safety, published in 1978, 1979, 1980, and 1981.

As before, casualty data on gas ships have been compiled from reports published in Lloyds's List. The data originate in notifications by shipowners to insurance underwriters of potential damage claims. It is believed that all incidents resulting in serious damages or hazard have been recorded, as owners have every reason to report what might be major losses to their insurance carriers. A complete listing of casualties over the period 1964-1981 is to be found in the Appendix attached to this report.

Casualties which are judged "serious" are those where there was some actual or potential threat to the cargo containment system. Any spill or leakage of cargo creates a possibility of fire which could endanger nearby persons or property.

The three questions to ask about any incident are these:

1) Could the accident have resulted in cargo leakage; was there a risk of leakage?
2) Did some leakage of cargo in fact occur?
3) Did the spill ignite and cause fire damage?

The first question involves human judgment in identifying "serious incidents". The criteria used in this study have been to consider as serious:

1) All incidents of fire or explosion occurring anywhere on a gas ship.
2) Incidents of hull damage resulting from groundings, collisions with another ship, contact with stationary objects, and being struck while moored. (Not included were incidents when the cargo tanks were empty and gas-freed or filled with non-flammable cargo.)
3) All incidents of cargo spill or leakage.

Data relating to the consequences of accidents are much less judgmental. Casualty reports are quite clear as to whether cargo leakage occurred and whether a cargo fire resulted.

The findings, for LNG ships and other gas ships separately, and the comparative safety record, are presented in the sections following.

1981 Gas Safety Record - LNG Ships

LNG cargo is transported at or near atmospheric pressure at temperatures of minus 165 degrees centigrade. The cargo tanks are made from materials which retain ductility in this environment. They must be insulated to protect the hull structure and to control the rate of cargo vaporization.

The first regular shipment of LNG began in 1964. Between 1964 and 1981 the operating LNG fleet has delivered approximately 6,500 LNG cargos. The number of vessels classified to carry LNG totals 65. Of these, 50 have transported an LNG cargo, and one vessel has been retired from active service.

This survey has identified eleven serious incidents over eighteen years where, in the judgment of POTEN & PARTNERS INC., some risk of cargo leakage or fire appeared to exist. The serious incidents and their consequences are summarized below.

Summary of Serious Incidents (LNG ships)

Type of Incident	Number of Incidents 1981	1964-1981	Cargo Leakage	Cargo Fire
Collision while underway	1	2	0	0
Struck while moored	0	1	0	0
Contact with stationary object	0	1	0	0
Grounding	0	2(b)	0	0
Explosion/fire on board	1	4	0	0
Spillage of cargo	0	1	1(a)	0
T O T A L S	2	11	1	0

(a) The MOUSTEFA BEN BOULAID had an LNG spill of 15 minutes duration while discharging cargo at Cove Point, Maryland on April 8, 1979. Leakage resulted from a construction defect in a safety valve. Damage was limited to deck fractures. There was no cargo tank damage. Repairs were subsequently made at the yard.

(b) The EL PASO PAUL KAYSER hit a submerged rock on June 29, 1979, in the Straits of Gibraltar. Approximately 850 tons of steel were ripped out of the hull bottom and twelve bottom and wing tanks, duck keel and forward pump room were exposed to the sea. The cargo containment system however, remained intact. On July 4, the vessel was refloated and towed 2-1/2 miles to the Bay of Algerciras where all cargo was transferred, seven days later, to the EL PASO SONATRACH.

The LNG TAURUS grounded in heavy seas off the west coast of Japan on December 12, 1980, rupturing four ballast tanks. The cargo containment system, however, remained intact. On December 16, the vessel was refloated and towed to Tobata, Japan where the cargo was discharged. Repairs were effected at Nagasaki and the ship returned to service April 18, 1981.

The record indicates that in no instance was a tank damaged so that cargo escaped. No case of cargo fire is to be found.

Problems have arisen in recent years in the design of particular LNG containment systems. Three 125,000 cubic meter LNG carriers on order at Avondale Shipyard were rejected for LNG service after the initial ship failed gas-trials. Ships of the Gaz Transport design have required tank modifications to eliminate sloshing problems. It should be noted that no LNG ship is placed in LNG service until after it has passed rigorous tests on hull structure, cargo containment, and vessel performance at the shipyard and during sea trials and gas trials. Industry vigilance in detecting and addressing potential ship design or construction flaws has helped to keep to a minimum the number of serious accidents while carrying an LNG cargo.

1981 Gas Safety Record - LPG Ships

LPG has been carried in ships since 1926, originally in pressure bottles at ambient temperatures, but by the late 1950's, at reduced temperatures and pressures. The fleet now in service consists of pressure only, pressure and refrigerated combined (semi-refrigerated), and fully-refrigerated designs. In addition to LPG (propane and butane), many of the ships can carry a range of cargos such as anhydrous ammonia, propylene and butylene, butadiene, and vinyl chloride monomer. All of these gases are characterized by being heavier than air at normal temperatures, and by being flammable when mixed with air.

Since 1964, the number of LPG ships (over 5,000 cubic meters) in service has totalled 181. Of these, 176 are currently operational, four have been scrapped or retired, and one has been deliberately sunk (see note). The fleet has delivered approximately 23,000 cargos of LPG or other liquefied gases.

There have been 46 serious incidents to this fleet over this period where, in the judgement of POTEN & PARTNERS, INC., some risk of cargo leakage or fire appeared to exist. The serious incidents and their consequences are summarized below:

Summary of Serious Incidents (LPG ships)

Type of Incident	Number of Incidents 1981	1964-1981	Cargo Leakage	Cargo Fire
Collision while underway	0	10	0	0(a)
Struck while moored	0	6	0	0
Contact with stationary object	2	6	0	0
Grounding	0	12	0	0
Explosion/fire on board	1	11	0	0(b)
Spillage of cargo	0	1	1(c)	0
T O T A L S	3	46	1	0

(a) The YUYO MARU NO. 10 incident is a special case. The vessel, a composite ship carrying naphtha and LPG, was rammed and set afire in Tokyo Bay on November 9, 1974. The naphtha tanks ruptured in the collision, and the naphtha ignited. The fire burnt for several days before the ship was deliberately sunk. Despite the conflagration, it appears that the LPG tanks may have remained intact.

(b) The DANIAN GAS, while discharging propane at Donges on October 10, 1978, suffered a pump failure. Pump internals seized and overheated. A small amount of cargo was involved in the resulting localized fire, but damage was minimal.

(c) The LAVOISIER suffered a cargo leak while discharging butane at Bordeaux on March 23, 1967. A fracture in the safety valve may have been responsible. The cargo did not ignite.

As with LNG ships, no instance has been found of a cargo spill resulting from hull or tank damage. Equally, no case of LPG cargo fire is to be found.

Gas Ships - The Comparative Record

No definitive judgment can be made as to whether gas ships are safer or less safe than other ships carrying liquid fuels.

A comparative analysis of casualties was completed in 1981 by the Inter-Governmental Maritime Consultative Organization (IMCO). The results, as shown below, appeared to indicate a lower annual casualty record for gas ships than for oil tankers.

IMCO's assessment of serious casualties is not necessarily identical to that of Poten & Partners. Individual judgements will vary on a case-by-case analysis.

Apparent Serious Casualty Rate (1968-80)

	Oil Tankers (over 10,000 DWT)	Gas Ships (over 10,000 CBM)
Fleet - number of vessels	3,205	170
Fleet - number of ship-years	42,450	1,168
Serious Casualties	1,004	10
Casualty Rate (per 100 ships at risk)	2.37	0.86

Source: IMCO Analysis of Serious Casualties to Sea-Going Tankers of 10,000 DWT and Above 1968-1980. (Report of the Steering Group on Casualty Statistics, November 27, 1981.)

Of 1,004 serious oil tanker casualties reported, 252 occurred between 1978 and 1980. The year 1979 evidenced a very high incidence rate of serious casualties to tankers. The gross tonnage of all ship types lost from the world fleet was the highest ever experienced in peace time. In 1980, serious casualties to tankers were at the lowest level experienced since 1974. Overall 1980 incidence rate was lowest for the largest size vessels.

IMCO statistics report the oil tanker fleet evidenced 239 groundings, 165 collisions, and 212 breakdowns. During 1968-1980, the gas carrier fleet experienced one collision, three groundings, three breakdowns, and one explosion caused by welding in the tanks of the ship under repair. Three of these gas carrier casualties (two groundings and one breakdown) occurred in 1980.

Design requirements for gas ships, as codified by the U.S. Coast Guard and the Inter-Maritime Consultative Organization, are commensurately stricter than those for oil tankers. For instance, typical gas ships are constructed with double bottoms and double side-shells to minimize the ispact on cargo tanks in the event of collision. Cargo tanks themselves must be located at specified minimum distances inboard from the ship's shell plating. The tanks are always sealed. During loading and discharge operations, gas is returned to the ship to replace the volume of liquid that is discharged (or vice-versa if loading), thus precluding the possibility of air entering the tanks at any time.

These built-in safeguards may have played a role in preventing serious consequences of accidents to gas ships. The IMCO data identify 125 incidents of cargo fires to oil tankers over the period 1968-1980. No incidence of cargo fire is attributed to the gas carrier fleet.

Another factor which may account for the lower occurrence of serious casualties to the gas carrier fleet is the comparatively younger age of the fleet. At January 1, 1981, 26 percent of the tanker fleet was 6 years old or younger while 32 percent of the LPG fleet and 58 percent of the LNG fleet were of comparable age. Oil tanker fleet casualty statistics indicate there is a degree of dependence on age in the incidence rates. This is especially evidenced in the 45,000-149,999 deadweight category. All categories, except that of vessels 150,000 dwt and above, show a significantly higher rate of casualties for tankers 15 or more years of age.

There is no conclusive evidence which shows that the rate of serious casualties increases with the age of the ship. But one might intuitively expect newer ships, built to later standards and specifications and less subject to wear and tear, to perform better and with fewer problems while in service.

None of the above proves that gas ships are intrinsically safe, or even that they are safer than oil tankers. LNG and LPG may be hazardous cargos, yet the record clearly shows that they have been handled safely in the past. History does not tell us that a major accident cannot occur, only that it need not occur. The standards of crew training and of ship construction being continually raised, there is every reason to expect past levels of safety to be maintained or even surpassed.

APPENDIX

REPORTED CASUALTIES TO LIQUEFIED GAS CARRIERS ABOVE 5,000 CBM

THE HISTORICAL RECORD (1964-1981)

NOTE: Casualties included in this report were obtained from LLOYD's LIST. Data shown were compiled from this source by Maritime Data Network Ltd. of Stamford, Connecticut, which does not guarantee the accuracy of the information and does not accept responsibility for errors or omissions or their consequences.

This is a compilation of all reported casualties sustained by liquefied gas carriers (larger than 5,000 cubic meters cargo capacity) during the 18-year period from 1964 to 1981.

Data were compiled on a total of 246 ships and 358 reported casualties of all types. Unmanned barges were excluded.

Cargo Tank Type	Number of Ships	Number of Casualties
I - Insulated for LNG	65	75
R - Refrigerated	121	234
S - Semi-Refrigerated	58	48
P - Pressurized	2	1
TOTAL	246	358

Casualty data on gas ships have been compiled from reports published in Lloyd's List. The preliminary casualty reports have no official status and were not submitted to any governmental agency. In many cases, detailed information on the cause or consequences of a casualty was not available at the time a report was filed. The wording of the reports should not be construed as fixing blame or responsibility for any casualty, for such determination had not been made at the time of reporting.

The information contained herein originated in preliminary reports of potential insurance claims. It is believed that all or virtually all casualties involving substantial damages were reported and are included here.

In the case of minor incidents where no damage was immediately apparent, reporting practices by shipowners have varied. Some owners, and the fleets of certain nations, tend to self-insure, and thus do not report such incidents. On the other hand, the fleets of certain nations (such as Great Britain), which traditionally have had close reporting relationships with Lloyd's, are likely to be over-represented. Thus a simple count of casualties by vessel is not especially meaningful. The number of casualties shown does not necessarily give an indication of the quality of the ship or of shipboard operation.

LIQUEFIED GAS SHIPS

(Index of Vessels Over 5000 CBM)

VESSEL NAME	Cargo Tank Type	Number of Years in Service	Number of Reported Casualties (1964-81)	Reference Page No.
A. CABRAL	S	3	0	
AEGIS DILIGENCE (constructive total loss 1975)	R	7	8	1,2
AHKATUN	R	1	0	
AL BERRY	R	2	2*	2
AL BIDA	R	2	2*	3
AMVROSIOS	R	7	0	
ANTILLA BAY	R	8	2	3
ANTILLA CAPE	R	13	2	4
ARCTIC TOKYO	I	12	2	4
ARISTOTLE (retired from trading 1975)	I	17	9	5,6
BEAVA (scrapped 1974)	R	12	1	7
BEN FRANKLIN	I	6	2	7
BENGHAZI	S	3	0	
BERGA (ex PASCAL)	S	14	2	8
BERGE SAGA	R	2	1*	8
BERGE SISAR	R	2	0	
BERGE SISU	R	2	0	
BERGE SUND	R	0	0	
BERNARDO HOUSSAY (ex BARFONN)	S	12	0	
BLUE OCEAN (ex HOEGH SWALLOW)	R	4	0	
BOLDURI	S	4	0	
BORAL GAS (ex HEBE)	S	5	3*	8,9
BOW ELM	S	10	3	9
BRIDGESTONE MARU NO. 5	R	12	0	

VESSEL NAME	Cargo Tank Type	Number of Years in Service	Number of Reported Casualties (1964-81)	Reference Page No.
CANTARELL	R	1	0	
CAPO OVEST (ex MARIOTTE/AEOLOS)	R	14	2	10
CAROL TEMSE	S	0	0	
CAVENDISH	R	10	3	10
CELSIUS	S	2	0	
CENTUM	R	3	0	
CENTURY (ex LUCIAN)	I	7	0	
CHEMTRANS WEGA (ex BAVARIA MULTINA)	S	4	1	10
CHIHANI BACHIR	I	2	0	
CLERK MAXWELL	R	15	6	11
COLOMBUS (ex SUN GAS)	S	4	0	
CONTOVELLO (ex GREAT CRANE GOSHO MARU)	R	20	3	12
CORAL ISIS	S	5	3	12,13
CORNUCOPIA	R	3	0	
DANIAN GAS (ex PHILLIPS ARKANSAS/ AMY MULTINA)	R	12	5	13,14
DELTAGAS	S	6	2*	14
DESCARTES	I	10	0	
DEVONSHIRE	R	7	5	14,15
DISCARIA (ex CYPRESS/FERNVALLEY)	R	12	5*	15,16
DOROTHEA SCHULTE	S	0	0	
DUBULTY	S	4	0	
DZINTARI	S	5	0	

VESSEL NAME	Cargo Tank Type	Number of Years in Service	Number of Reported Casualties (1964-81)	Reference Page No.
EDOUARD LD	I	4	0	
EIRIK RAUDE (ex MUNDOGAS BERMUDA)	S	14	2*	16
EL PASO ARZEW	I	3	0	
EL PASO CONSOLIDATED	I	4	1	17
EL PASO HOWARD BOYD	I	2	2	17
EL PASO PAUL KAYSER	I	6	1	18
EL PASO SONATRACH	I	5	0	
EL PASO SOUTHERN	I	3	2	18
ENRICO FERMI	R	4	0	
EPSILONGAS	S	4	1	18
ESSO BREGA	I	12	0	
ESSO FUJI	R	8	0	
ESSO LIGURIA	I	11	0	
ESSO PORTOVENERE	I	11	0	
ESSO PUERTO RICO (retired 1976)	P	17	1	19
ESSO WESTERNPORT	R	4	0	
FARADAY	R	10	4	19
FERNWAVE	S	9	2	20
FRITZ HABER (ex IRENE)	S	10	0	
GADILA	I	8	1	20
GADINIA	I	9	0	
GALCONDA	R	3	0	
GALILEO (ex CERNOS/ZENON/ AEOLOS II)	R	14	13	20,21,22
GALPARA	R	3	0	
GAMBADA	R	8	4	23
GAMBHIRA (ex BUTANAVAL/ BUTANUEVE)	R	12	6*	23,24
GAMMAGAS	S	9	2*	25
GANDARA	R	5	2*	25
GARALA	R	2	1*	26
GARBETA	R	6	1	26
GARI	I	8	0	
GARINDA	R	4	3*	26,27
GAS AL AHMADI	R	2	0	
GAS AL BURGAN	R	2	1	27
GAS AL KUWAIT	R	3	0	

VESSEL NAME	Cargo Tank Type	Number of Years in Service	Number of Reported Casualties (1964-81)	Reference Page No.
GAS AL MINAGISH	R	1	0	
GAS DIANA	R	3	0	
GAS ENTERPRISE (ex RAZI)	R	4	1	27
GAS GEMINI	R	4	1*	27
GAS LIBRA	R	1	0	
GAS PILOT (ex GAS LION)	R	13	2	28
GAS RISING SUN	R	3	0	
GASTOR	I	5	0	
GASTRANA	I	7	0	
GAZANA	R	9	10	28,29
GAZ FOUNTAIN	R	12	15*	29,30,31,32
GENKAI MARU	R	1	0	
GENOTA	I	6	0	
GEOMITRA	I	6	2	32
GIMI	I	5	0	
GOLAR FREEZE	I	4	0	
GOLAR FROST	R	1	0	
GOLAR SPIRIT	I	0	0	
GOULDIA	I	6	1	33
GUAPORA	S	0	0	
GUARA	S	0	0	
GUARUJA	S	0	1*	33
HAMPSHIRE	R	7	4	33, 34
HARDANGER	S	9	1	34
HASSI R'MEL	I	10	1	34
HAVIS	R	11	3*	35
HELICE	S	2	0	
HELIOS (ex FERNBANK)	S	5	0	
HERA	R	4	0	
HERMAN SCHULTE	S	1	0	
HEROS	S	3	0	
HESPERUS (ex FERNBROOK)	S	5	0	
HILLI	I	6	3	35,36
HOEGH GANDRIA	I	4	1	36
HOEGH SHIELD	S	12	3	36
HOEGH SKEAN (ex HOEGH MULTINA)	R	10	2	37
HOEGH SWORD	R	2	0	
HUMBOLDT	S	13	10	37,38

VESSEL NAME	Cargo Tank Type	Number of Years in Service	Number of Reported Casualties (1964-81)	Reference Page No.
INGE MAERSK	S	9	2	39
IGLOO FINN	S	0	0	
ISABELLA (ex KENAI MULTINA)	I	6	1	39
ISAVENA (ex GRAND REXTAR/BRIDGESTONE MARU II)	R	17	0	
ISFONN	R	14	1	39
IZUMISAN MARU	R	11	0	
JOSE COLOMBO	R	1	0	
JOSEPH P. GRACE	R	17	14	40,41
JOULE (ex HAVGAS)	R	16	5*	42
JOYAMA MARU	R	16	0	
JULES VERNE	I	16	4	43
KANAYAMA MARU	R	11	0	
KAZUTAMA MARU	R	15	0	
KHANNUR	I	4	1	43
KOCKUMS HULL 559	I	0	0	
KOCKUMS HULL 564	I	0	0	
LAIETA	I	11	0	
LAKE CHARLES	I	1	1*	43
LARBI BEN M'HIDI	I	4	1*	44
LAVOISIER	S	19	2	44
LENSOVET	R	1	0	
LIELUPE	S	3	0	
LINCOLNSHIRE	R	9	11	44,45,46
LNG AQUARIUS	I	4	1*	47
LNG ARIES	I	4	0	
LNG CAPRICORN	I	3	4*	47
LNG GEMINI	I	3	3*	48
LNG LEO	I	3	5*	48,49
LNG LIBRA	I	2	2	49
LNG TAURUS	I	2	1	49
LNG VIRGO	I	2	1*	50
LOUISIANA	I	1	0	
LORD KELVIN	R	3	1	50
LUIGI CASALE (ex CAPELLA/FRANKLIN)	R	14	1	50
LUIGI LAGRANGE	R	5	0	

VESSEL NAME	Cargo Tank Type	Number of Years in Service	Number of Reported Casualties (1964-81)	Reference Page No.
M.P. GRACE	R	14	6	50,51
MAGELLAN	S	4	0	
MARIANO ESCOBEDO	R	14	0	
MARINE EAGLE (ex PARKERSBURG/ESSO PARKERSBERG/FORT CORNWALLIS)	R	12	5	52
MAYORI	S	4	0	
METHANE PRINCESS	I	17	2	53
METHANE PROGRESS	I	17	7	53,54
METHANIA	I	3	0	
MONGE	R	4	0	
MONOMER VENTURE (ex ESSO CENTRO AMERICA/ESSO VENEZUELA/TARANCO/ MONTEBELLO)	R	19	4	54,55
MONTANA	I	6	0	
MONTERREY	R	2	1*	55
MOSSOVET	R	2	0	
MOSTEFA BEN BOULAID	I	5	3	55,56
MOURAD DI DOUCHE	I	1	0	
MUNDOGAS AMERICA (ex GARMULA)	R	9	10	56,57,58
MUNDOGAS ATLANTIC	S	12	0	
MUNDOGAS BRASILIA	S	20	0	
MUNDOGAS EUROPE (ex KRISTIAN BERKELAND/ FERNWIND)	R	13	3	58
MUNDOGAS NORTE (scrapped 1971)	P	18	0	
MUNDOGAS PACIFIC (ex GAS MASTER/ FERNWOOD)	R	12	6	58,59
MUNDOGAS RIO	R	14	2	60

VESSEL NAME	Cargo Tank Type	Number of Years in Service	Number of Reported Casualties (1964-81)	Reference Page No.
NEKTAR	R	6	0	
NESTEFOX	S	4	0	
NESTOR	I	4	0	
NOPAL TELLUS (ex ROLAND/TRINA MULTINA/KATRISA)	R	13	2	60
NORMAN LADY	I	8	1	60
NORTHERN ARROW	R	3	2*	61
NORTHERN EAGLE	R	3	2*	61
NUEVO LAREDO (ex SYDFONN)	R	3	0	
NYHAMMER	R	6	0	
NYHAVN	R	13	1	62
OCEAN FROST (ex HAVFROST)	R	15	2	62
OGDEN BRIDGESTONE	R	8	5*	62,63
OGDEN GENERAL	R	6	0	
OSCO BEDUIN	S	2	0	
OSCO BELLONA	S	1	0	
PALACE TOKYO	R	7	0	
PASCAL	S	5	1	63
PERMIAN GAS (ex CAP D'ANTIBES/ GLOBAL GAS)	S	13	2	64
PETROGAS I (ex PAUL ENDACOTT/ NORFOLK MULTINA/ CASSIE HILL)	R	17	0	
PETROLAGAS-2 (ex HOEGH SWIFT)	R	4	0	
PETRON GASUL (ex BRIDGESTONE MARU/ BRIDGESTONE MULTINA/ CONTANK BRIDGESTONE)	R	19	2	64
PINE QUEEN	R	7	0	
PIONEER LOUISE	R	5	1	64
POLAR ALASKA	I	12	5	65
POLLENGER (ex LNG CHALLENGER)	I	7	4	66
PRINCE YAMAMOTO	S	0	0	
PUERTO RICAN	R	10	2*	66,67
PYTHAGORE (ex ARQUIMEDES)	R	14	5	67,68

VESSEL NAME	Cargo Tank Type	Number of Years in Service	Number of Reported Casualties (1964-81)	Reference Page No.
RAMDANE ABANE	I	0	0	
REYNOSA	R	2	0	
RIBAGORCA (ex BRIDGESTONE MARU III/TAGUS)	R	15	2*	68
SALLY MAERSK	S	0	0	
SANDRINA (ex ATLANTE/ PROVIDENCE MULTINA)	R	8	2	68,69
SANT JORDI	S	4	1	69
SARGASSO	S	0	0	
SARRAT (ex CAP MARTIN/SAVOIE/ CRYSTAL/RYE GAS)	S	18	2*	69
SINE MAERSK	S	5	0	
SOFIE MAERSK	S	4	0	
SMOLNYY	R	1	0	
STAFFORDSHIRE	R	4	0	
STENA OCEANICA (ex MALMROS MULTINA/ MANDRILL)	R	7	0	
SUNNY LADY	S	0	0	
SUN RIVER	R	7	0	
SUSAN MAERSK	S	0	0	
SVENDBORG MAERSK	S	0	0	
TATSUNO MARU	R	14	2*	70
TELLIER	I	8	0	
TENAGA DUA	I	1	0	
TENAGA EMPAT	I	0	0	
TENAGA LIMA	I	0	0	
TENAGA SATU	I	1	0	
TENAGA TIGA	I	0	0	
TOKUHO MARU	R	7	0	
TOYOSU (ex TOYOSU MARU/ CALTEX LISBON/SUNSET)	R	4	1	70
TROPIGAS FAR EAST	R	15	0	

VESSEL NAME	Cargo Tank Type	Number of Years in Service	Number of Reported Casualties (1964-81)	Reference Page No.
VASCO DA GAMA	S	5	2	70,71
VENATOR	I	8	0	
VESTRI	S	9	0	
WILLIAM R. GRACE	R	17	9*	71,72
WILTSHIRE	R	13	2	72
WORLD BRIDGESTONE	R	10	1	73
WORLD CONCORD	R	5	0	
WORLD CREATION	R	5	0	
WORLD RAINBOW	R	10	0	
WORLD VIGOUR	R	4	0	
YAMAHIDE MARU	R	15	0	
YURMALA	S	5	0	
YUSHO MARU	R	10	0	
YUYO MARU	R	2	0	
YUYO MARU NO. 10 (Total loss 1974)	R	8	1	73

* Includes a casualty or casualties reported in 1981.

REPORTED CASUALTIES TO LIQUEFIED GAS CARRIERS ABOVE 5000 CBM

VESSEL NAME	CUBIC METERS	FLAG	OWNERS	YEAR BUILT	TANK TYPE: TEMP. C
AEGIS DILIGENCE	11,706	Greek	Cargo Atlantica Nav. S.A.	1968	R-48

Oct. 4, 1968 Weather Damage	At Sea	As ALEXANDER HAMILTON, Panamanian flag, sustained damage to shell plating forward due heavy weather on voyage from Norway to Strait of Florida, for orders. Repairs surveyed at Bilbao, Spain, June 1969.
Jan. 11-15, 1969 Machinery Damage	At Sea	As ALEXANDER HAMILTON, Panamanian flag, sustained damage to pistons of refrigerating gas compressors Nos. 1 and 3 while on passage Curacao to Santos.
Feb. 13, 1969 Machinery Damage	At Sea	As ALEXANDER HAMILTON, Panamanian flag, while on loaded voyage from Punta Cardon, Venezuela to Buenos Aires, an abnormal noise was heard from the main engine. Inspection showed blower rotor blades bent, shaft and bearings damaged and casing scored. Unit was blanked off and vessel proceeded at reduced speed. A new blower unit was air freighted to Buenos Aires and installed during 4-day stay at the port.
April 20, 1969 Machinery Damage	At Sea	As ALEXANDER HAMILTON, Panamanian flag, while enroute Puerto Miranda, Venezuela to Buenos Aires sustained damage to port side electrically-driven air compressor due breakage of crankshaft. Repaired at Bilbao, Spain in June 1969.
June , 1969 Machinery Damage	?	As ALEXANDER HAMILTON, Panamanian flag, while repairing at Bilbao, Spain, master claimed damages to two cooling water pumps, cause and date unknown.
June 25-26, 1971 Weather Damage	At Sea	As ALEXANDER HAMILTON, Panamanian flag, sustained heavy weather damage enroute from San Lorenzo, Argentina to Trinidad for orders. Water in side ballast tanks fell and water leaked into the void spaces around Nos. 1, 2 and 3 gas tanks and into No. 2 cofferdam. Small cracks found in welding of inner longitudinal bulkheads of side ballast tanks. Sounding pipe to No. 2 ballast tank cracked, allowing water enter cofferdam. Vessel put in St. Vincent, Cape Verdi Islands overnight and then sailed for Rotterdam for full examination of damage.

(Casualties cont'd on next page)

REPORTED CASUALTIES TO LIQUEFIED GAS CARRIERS ABOVE 5000 CBM

VESSEL NAME	CUBIC METERS	FLAG	OWNERS	YEAR BUILT	TANK TYPE: TEMP. C
AEGIS DILIGENCE cont'd					
Jan. 14-15, 1973 Contact Damage	In Port	As ALEXANDER HAMILTON, Panamanian flag, while tied up at Bilbao, Spain, was struck by Spanish steamer that was in lay-up and broke her mooring lines due to a strong wind. The Alexander Hamilton in turn struck Liberian motor vessel El Gavilan. Both the Alexander Hamilton and the El Gavilan sustained some minor damages.			
Oct. 28, 1975 Engine Room Explosion; CONSTRUCTIVE TOTAL LOSS	In Port	While at Laurium Roads, Greece, fire occurred in the engine room following explosion. Further explosion occurred. Abandoned by crew. Fire raged for several days. Vessel subsequently towed by two salvage tugs and securely beached in lat. 37 47N, long. 24 05E, three days later, with fire still burning in engine room and double bottom missing. According to report, anchorcables were cut and vessel towed to isolated cove north of Laurium in view of possible danger to town of Laurium. On Nov. 13, fire appeared burnt out. Vessel towed Sarpsborg, Norway, in Feb. 1977 for long repair period.			
AL BERRY		76,700	Saudi	Arab Maritime Pet. Trans. Co.	1979	R-48
Nov. 1980 Hit Bottom, Grounded.	At Sea	Grounded enroute from Ras Tanura at 132.7 km in Suez Canal, detaining 17 vessels behind. Refloated next day by Suez Canal Authority tugs.				
Oct. 4, 1981 Contact Quay Wall	River/ Est'y	Contacted Quay Wall of Baudouin lock, River Scheldt at 0830 hrs. on October 4, 1981. Returned to Antwerp for repair. Sailed October 15, 1981 to Rotterdam. Damage to bulbous bow.				

(Casualties cont'd on next page)

REPORTED CASUALTIES TO LIQUEFIED GAS CARRIERS ABOVE 5000 CBM

VESSEL NAME	CUBIC METERS	FLAG	OWNERS	YEAR BUILT	TANK TYPE: TEMP. C
AL BIDA	76,700	Kuwaiti	Arab Maritime Pet. Trans. Co.	1979	R-48
Jan. 21, 1981 Collision	At Sea	Reported in collision with MLPG tank "Northern Eagle 1" off Kalamata on January 21, 1981, during transfer operations. No details of damage, if any, reported.			
Sept. 27, 1981 Crankcase Explosion	At Sea	Sustained crankcase explosion during voyage from Lake Charles to Ras Tanura on September 27, 1981. Surveyed at Ras Tanura on October 24, 1981. Port main engine piston, gudgeon pin, bottom end bearings and liner of No. 5 cylinder unit damaged.			
ANTILLA BAY	53,424	Neth. Antilles	Nedlloyd Bulk B.V.	1973	R-48
Feb.12-13, 1973 Weather Damage; Contact, Stranding	In Port	While loading propane at Zueitina, Libya vessel stopped loading on account of heavy weather and, endeavouring to reach open sea, scraped buoy, propeller fouled, two anchors lost and rudder not responding, strong winds pushed her towards beach, and she grounded. Vessel refloated 36 hours later with assistance of two tugs. Cargo on board at time of incident was 408 barrels of propane. Vessel was towed to Toulon, France, for repairs. At time of loading vessel had not yet been delivered to its owners and was still the responsibility of Constructions Navales et Industrielles de la Mediterranee, La Seyne. Vessel later arrived June 3rd at Port de Bouc from Toulon, France.			
Oct. 31, 1979 Machinery Damage	In Port	At Kobe, Japan, owners requested survey of economiser damage. No other details.			

(Casualties cont'd on next page)

REPORTED CASUALTIES TO LIQUEFIED GAS CARRIERS ABOVE 5000 CBM

VESSEL NAME		CUBIC METERS	FLAG	OWNERS	YEAR BUILT	TANK TYPE: TEMP. C
ANTILLA CAPE		29,540	Neth. Antilles	Nedlloyd Bulk B.V.	1968	R-51
April 7, 1973 Power Failure	At Sea	On loaded voyage from Ras Tanura, Saudi Arabia, to Corpus Christi, Texas, severe damage sustained to No. 1 port generator, allegedly due automatic paralleling process becoming defective and causing the circuit-breaker to close while machine was out of synchronization with result that vessel had complete power failure. Upon restoring power vessel proceeded on voyage. Vessel put into Durban, S.A., where examination found considerable damage to generator. Vessel put damaged generator ashore and proceeded with two diesel-driven generators.				
April 1980 Generator Failure	?	Nos. 2 and 3 generators failed in service due to piston breakage and cooling water failure. Reported in San Francisco. Actual date unknown. Seven cylinder heads replaced in No. 2 generator. Survey required for No. 3 after temporary repairs.				
ARCTIC TOKYO		71,500	Liberian	Arctic LNG Transportation Co.	1969	I-162
Sept. 14, 1971 Weather Damage	At Sea	Vessel reported heavy weather damage to No. 1 cargo tank insulation. Arrived 8 days later at Yokohama from Kikiski, Alaska and sailed 2 days later for Nikiski. No details of damage.				
July 15, 1973	?	Left Nikiski, Alaska for Vancouver to repair bow damage. Arrived Vancouver July 19, and left on July 22nd. No details of the damages or cause stated.				

(Casualties cont'd on next page)

REPORTED CASUALTIES TO LIQUEFIED GAS CARRIERS ABOVE 5000 CBM

VESSEL NAME	CUBIC METERS	FLAG	OWNERS	YEAR BUILT	TANK TYPE: TEMP. C
ARISTOTLE	5,123	Panamanian	The Counties Ship Management Co. Limited	1945 Rebuilt: 1958	I-162

Jan. 9, 1965 Lost Port Anchor	In Port	As METHANE PIONEER, British Flag, while proceeding from Canvey Island, U.K., to Grangemouth, lost port anchor, no chain, about nine cables from Sea Reach No. 7 Buoy in Thames Estuary. No other details.
April 7, 1965 Machinery Damage	At Sea	As METHANE PIONEER, British Flag, put in Belem, Brazil, on voyage from Rio de Janeiro to Houston. Water in engine room bilges and tunnel. Auxiliaries pumped dry but reflooded. Valves tested but local repairs unsatisfactory. Seaworthy certificate issued to Trinidad only. Left Belem 3 days after arrival. No other details.
Aug. 26, 1966 Machinery Damage	In Port	As METHANE PIONEER, British Flag, at Port de Bouc, France, generator crankshaft broken, requiring renewal as well as bearings, etc. No other details.
Nov. 21, 1966 Broke Down	At Sea	As METHANE PIONEER, British Flag, main engine broke down at sea on voyage from Puerto la Cruz, Venezuela to Buenos Aires, and vessel drifted for two days while effecting repairs. Proceeded on voyage to B.A. at reduced speed. Damages consisted of No. 1 cylinder liner fractured, piston skirt fractured in two places, Nos. 2, 3 and 4 main journals scored, No. 2 and 4 main bearings white metal wiped, No. 3 main bearing white metal broken and partly missing and corrresponding lower shell broken. Failure of this bearing apparently originated all damages. Left B.A. after nine days in port for Japan, and put back to B.A. the same day with main engine damages. Several main bearings heavily wiped. Finally departed B.A. 30 days after putting back with engine damages.

(Casualties cont'd on next page)

REPORTED CASUALTIES TO LIQUEFIED GAS CARRIERS ABOVE 5000 CBM

VESSEL NAME	CUBIC METERS	FLAG	OWNERS	YEAR BUILT	TANK TYPE: TEMP. C
ARISTOTLE cont'd					
Dec. 12, 1967 Machinery Damage	?		As ARISTOTLE, surveyor appointed at Marseilles reporting No. 4 cylinder liner broken at top flange, requiring renewal. Alleged cause unequal tightening of liner when fitted by crew and subsequent aggravation by corrosion.		
Feb. 14, 1969 Crew Negligence Damaged Pumps	?		As ARISTOTLE, two cargo pumps in tanks No. 2 and 3 damaged by alleged crew's negligence in overfilling with lubricating oil. Repairs completed at Marselles.		
Sept. 27, 1970 Stranding in River	In Port		As ARISTOTLE, stranded in River Coatzacoalcos, Mexico, on voyage from Puerto la Cruz to Minatitlan, loaded with propane and butane gas. Refloated two days later with tug assistance. Apparently no damage sustained by bottom in mud. Left for Puerto Miranda 3 days later. At Boston drydock Jan. 1971, found bottom plating damaged by grounding.		
Nov. 24, 1970 Heavy Weather Lost Rudder	At Sea		As ARISTOTLE, lost rudder about 200 miles north of Azores in gale force winds on voyage from Arzew, Algeria, to Boston with methane cargo. Tug towed vessel to Boston for 14 day tow. After discharge drydocked at Boston. Rudder damage probably due to pintle falling out, cause unknown, and subsequent heavy weather induced stock to fracture, with loss of rudder.		
July 24, 1971			As ARISTOTLE, vessel placed in Recife, Brazil for use as a storage vessel. No longer in class, but still afloat and in Lloyd's Register but not carried in Clarkson's Tanker Register.		

(Casualties cont'd on next page)

REPORTED CASUALTIES TO LIQUEFIED GAS CARRIERS ABOVE 5000 CBM

VESSEL NAME	CUBIC METERS	FLAG	OWNERS	YEAR BUILT	TANK TYPE: TEMP. C
BEAVA (LPG/Oil)	9,470	Liberian	Avanti S.S. Co.	1945 Rebuilt: 1962	R-41
Dec. 16, 1973 Hit While Anchored; Scrapped 10 Months After Incident — In Port	While anchored at Ras Tanura, Saudi Arabia, struck by ore/oil vessel OSWEGO FREEDOM and sustained extensive damage in way of amidships accommodation and port side holed and leaking from No. 3 wing tank (oil Tank) that contained naphtha. Other vessel only superficially damaged on bow with no cargo leakage, and she sailed next day for Bahrain for repairs to Suez Canal light. Aramco, terminal owners, refused to let BEAVA dock for safety reasons. Discharged naphtha into barges and repaired at Bahrain for two weeks and then left for Japan. Vessel was scrapped in October 1974 at Taiwan.				
BEN FRANKLIN	120,000	French	Methane Marine S.A.	1975	I-165
Dec. 1-2, 1976 Broke Moorings in Violent Wind — In Port	Broke moorings at Marseilles, during a violent windstorm, where winds reached 183 kph, and struck Panamanian steamer FRANCESCA which was crushed and sank. No details on damages sustained by BEN FRANKLIN. (Vessel reported to be in yard at time of casualty. Cargo and ballast tanks were empty. Owner reports that vessel was not at LNG berth, and mooring facilities were inadequate.)				
Jan. 20, 1979 In Near Gale Winds Broke Shackle of Mooring Chain — In Port	In strong winds, near gale force, last few days while in lay-up at Hyeres, France, vessel broke a shackle of mooring chain. Next day when winds moderated vessel reconnected to buoy. Vessel remained at anchorage while waiting for winds to abate to reconnect.				

(Casualties cont'd on next page)

REPORTED CASUALTIES TO LIQUEFIED GAS CARRIERS ABOVE 5000 CBM

VESSEL NAME		CUBIC METERS	FLAG	OWNERS	YEAR BUILT	TANK TYPE: TEMP. C
BERGA		6,310	Algerian	Algerienne, Cie. Nationale	1967	S-45
Nov. 22, 1969 Contact in Canal	In Port	As PASCAL, French flag, in ballast enroute Rouen for Riga, contacted Danish motor vessel KRETA in siding at Fischerhutte, Kiel Canal, West Germany. Both vessels were slightly damaged but proceeded. No other details.				
May ?, 1970 Hull Damage	In Port	Sustained hull damage during a storm in the port of Algiers, Algeria. Entered dock at Marseilles for repairs estimated to take about 10 days. No details of cargo status or repairs.				
BERGE SAGA		75,680	Norwegian	Sig. Bergesen d.y.	1979	R-50
March 23, 1981 Hull Damage	At Sea	Hull damage noted. Ship arrived Flushing October 5, 1980 to be used as a storage ship. Report received from Antwerp. Port side bulwarks at aft end of of main deck set inboard 60 mm max affected over a length of about 10M with six bulwark stays behind tripped and upper edge of main sheer very lightly disturbed in two locations. Arrived Flushing October 5, 1980 to be used as a storage vessel.				
BORAL GAS		5,170	Fijian	Huddart Parker Industries	1976	S-48
Nov. 15, 1976 Repairs Required	At Sea	As HEBE, Norwegian flag, left Santos, Brazil for Las Palmas, put back the same day and anchored in roads for repairs. Sailed for Las Palmas 6 days later. No indication of nature of repairs.				

(Casualties cont'd on next page)

REPORTED CASUALTIES TO LIQUEFIED GAS CARRIERS ABOVE 5000 CBM

VESSEL NAME		CUBIC METERS	FLAG	OWNERS	YEAR BUILT	TANK TYPE: TEMP. C
BORAL GAS cont'd						
Apr. 17, 1979	In Port	As HEBE, Norwegian flag, during berthing at "DOW" terminal, Salvador, Brazil, contacted by tug TIMOTEO on rudder. Tug broke own rudder. HEBE proceeded and berthed normally.				
Nov. 24, 1981 Engine Trouble	At Sea	As BORAL GAS, reported engine trouble in Kandla area on November 24, 1981. Survey Requested. Possible bearing and engine failure.				
BOW ELM		7,418	Norwegian	A/S Redereiet Odfjell	1971	S-104
June 21, 1973 Collision	In Port	Collided with tanker IRVINGSTREAM, at anchorage entrance to Saint John, N.B. harbor. BOW ELM was loaded with caustic soda. Other vessel's damage confined to bow, consisting of 6 bow plates, internals, part of stem and anchor pockets to renew. BOW ELM sustained hull damage amidships extending below waterline. Necessary renew 5 shell plates and fair adjacent plates, frames, brackets and deck plating, with repairs completed at Jacksonville.				
Apr. 24, 1974 Collision	In Port	Collided with motor research vessel IDA GREEN and then struck U.S. Army Corps Hopper Dredger, A Mackenzie, which sank in Houston Ship Channel, Texas. The dredger was scrapped following the collision. The IDA GREEN sustained a crumpled bow but returned to port under her own power. The BOW ELM sustained a gash about 10 ft. long and 18 in. wide just above the bulbous bow. No information on the status of cargo on BOW ELM.				
Aug. 7, 1977 Stranding	At Sea	Stranded 3-1/2 miles off Florida coast near Fowey Rocks Light in lat. 25 31 48N, long, 80 06 12W. Lightered part of the bunkers and was refloated next day. Cargo consisted of butane and butadiene. No structural damage and no danger reported by U.S. Coast Guard spokesman. Later report alleged vessel had two holes. Vessel arrived Houston, Texas, 5 days after stranding.				

(Casualties cont'd on next page)

REPORTED CASUALTIES TO LIQUEFIED GAS CARRIERS ABOVE 5000 CBM

VESSEL NAME		CUBIC METERS	FLAG	OWNERS	YEAR BUILT	TANK TYPE: TEMP. C
CAPO OVEST		14,800	Italian	Cossira Cia. di Nav. S.p.A.	1967	R-48
Oct. 21, 1970 Contact in Kiel Canal	In Port	As MARIOTTE, French flag, collided lightly with Finnish vessel MALMI, with a cargo of coal, in siding at Konigsforde, Kiel Canal. Both vessels were slightly damaged but proceeded. MARIOTTE enroute Pascagoula for Uusikaupunki, Finland.				
May 20, 1974 Engine Damage	At Sea	As MARIOTTE, had to return to port of Dunkirk, France, twice within 24 hours owing to engine damage. No details of the nature of the damage or the time to repair it were given.				
CAVENDISH		40,213	British	Ocean Gas Transport	1971	R-45
June 28, 1976 Cargo Condenser Damage	In Port	While repairing at Cadiz, Spain, master requested surveyor to inspect damage to cargo condenser. No other details.				
Feb. 26, 1978 Weather Damage in Port	In Port	While loading butane at Escombreras, Spain, parted moorings due strong wind, damaged shore lines, valves etc. Contacted tanker JUAN DE CARDONA berthed near-by. Damage to other vessel confined to bulwarks and stanchions on forecastle head. CAVENDISH damaged shell way nos. 1 & 2 ballast tanks slightly and dragged mooring buoy under stern lightly damaging propeller.				
Aug. 10, 1979 Booster Pump Damage	In Port	Reported at Cartagena, Spain, with booster pump damage. Surveyor attended on board next morning and found damaged booster pump had already been repaired by crew members.				
CHEMTRANS WEGA		6,000	West German	Chemikaliern Seetransport	1977	S-104
June 8, 1978	In Port	Enroute Rendsburg, Kiel Canal, W. Germany for Stade, W. Germany, in ballast, alleged to have damaged dophin No. 63 in siding at Schulp. Vessel proceeded, apparently undamaged.				

(Casualties cont'd on next page)

REPORTED CASUALTIES TO LIQUEFIED GAS CARRIERS ABOVE 5000 CBM

VESSEL NAME		CUBIC METERS	FLAG	OWNERS	YEAR BUILT	TANK TYPE: TEMP. C
CLERK MAXWELL		11,753	British	Ocean Gas Transport	1966	R-50
Feb. 28, 1967 Pump Repairs	?	Put in Durban, S.A. for pump repairs, enroute Buenos Aires for Ras Tanura, S.A. Left Durban 8 days later. No details.				
June 19, 1967 Hit Wharf	In Port	Contacted wharf at Mar del Plata, Argentina and vessel and wharf sustained slight damages. Nose stem plating way of 25 foot draft set in and torn over nine inches and breasthook of forepeak buckled. Temporary repairs made in port. No information on extent of damage to wharf.				
Dec. 30, 1967 Stranding Twice	In Port	While in ballast reported grounded in Buenos Aires south entrance channel. Refloated with tug assistance next day but grounded second time in the same channel, where also fouled propeller with towrope, which later freed. Vessel refloated following day and proceeded on voyage.				
Jan. 9, 1977 Double Bottom Contamination	?	Arrived Petit Couronne, Rouen, France, with fractured ballast line No. 1 and 2 double bottom tanks contaminated by leakage of fuel oil via forepeak ballast line, which passes through No. 1 deep tank which was fuel tank. Crew to clean tank and new pipe to be welded in place during next voyage.				
July, 1978 Heavy Weather Damages	At Sea	Reported July 26, at Rotterdam with heavy damage. Arrived July 24 from Samsun, Turkey. Sailed from Rotterdam August 25 for sea trials. No details of damage provided.				
Jan 20/26, 1979 Heavy Weather Damages	At Sea	Sustained heavy weather damages on loaded passage from Tees, UK, to Houston, Texas. Bottom shell plating fractured 15 locations in way of double bottom tanks. Eight fractures in No. 1 cargo tank in way of anti-lift chocks. Shell heavily indented and fractured in way of starboard anchor. Repaired at Curacao from February 14 to March 14.				

(Casualties cont'd on next page)

REPORTED CASUALTIES TO LIQUEFIED GAS CARRIERS ABOVE 5000 CBM

VESSEL NAME	CUBIC METERS	FLAG	OWNERS	YEAR BUILT	TANK TYPE: TEMP. C
CONTOVELLO LPG/OIL	12,800	Japanese	Contovello Shipping	1961	R-41
Feb. 25, 1969 Collision — At Sea	As GOHSHU MARU, Japanese flag, collision with Swedish motor tanker THORNE in Lat. 04 56N, long. 98 15E, near entrance to Straits of Malacca. Gas carrier had some damage on port side and proceeded Singapore for survey and repairs. The tanker THORNE also put in at Singapore. No damage details.				
June 17, 1971 Collision — In Port	As GOHSHU MARU, Japanese flag, collided with motor vessel ODER, at entrance to Tokyo Bay in fog. Both vessels damaged and in port. Gas tanker left two days later after discharging at Yokohama. No other details.				
Jan. 28, 1974 Boiler Fire, Adrift — At Sea	As GREAT CRANE, Panamanian Flag, had fire in boiler while in Arabian Sea due boiler cracked due heating and ignited oil. Gas tanker was towed to Yokohama, arriving there 28 days after the fire in the boiler. No other details.				
CORAL ISIS	5,536	Neth. Antilles	Koraal Scheepr Mij.	1976	S-48
July 6, 1978 Grounding — In Port	Grounded in River Scheldt for 7-1/2 hours. Vessel with engine damage, was being towed. Apparently grounding occurred while manoeuvering. Engine "full out" and could not be started again so vessel drifted. Tug tried to hold vessel from grounding, but cable broke.				
July 1980 Heavy Weather Damage — At Sea	Heavy weather damage en route from U.S. Gulf to Geelong, July 4-6. High seas caused forecastle hood torn off and missing, chemical extinguisher hose torn from bolted seat and discharge cylinder thrown across deck, spar propeller securers buckled, no. 1 p/tank pressure gauge and sounding gauge pipes set aft, and miscellaneous damages. Permanent repairs were effected in Melbourne.				

(Casualties cont'd on next page)

REPORTED CASUALTIES TO LIQUEFIED GAS CARRIERS ABOVE 5000 CBM

VESSEL NAME		CUBIC METERS	FLAG	OWNERS	YEAR BUILT	TANK TYPE: TEMP. C
CORAL ISIS cont'd						
Dec. 1980 Engine trouble	At Sea	Engine trouble en route from Terneuzen to Butzfleth, carrying cargo of propylene. Vessel anchored at Cuxhaven and then proceeded to Butzfleth Dec. 30 with the assistance of two tugs.				
DANIAN GAS		26,504	Liberian	Reliance Gas Transport	1969	R-46
Jan 23, 1969 Collision	In Port	As PHILLIPS ARKANSAS, Liberian Flag, collision with Russian motor vessel Nemirovich Danchenko in Flushing Roads, Belgium, during dense fog. Engine room of Russian vessel reported flooded, cutting off the engines, and she was towed by salvage tugs into Flushing harbor. The gas tanker was arrested, at the request of the owners of the Russian vessel. Damages confined to ram bulb bow showing six shaped plates indented and internals in way buckled. Repairs deferred to owner's convenience. (Apparently gas tanker on maiden voyage. Not stated if carrying cargo).				
July 23, 1969 Hit Dock	In Port	As PHILLIPS ARKANSAS, Liberian Flag, damage sustained while berthing at Buenos Aires. Shell plates port side in way of frame No. 39 from aft and internals buckled. Repairs deferred.				
Nov. 14, 1969 Pump Damage	At Sea	As PHILLIPS ARKANSAS, Liberian flag, while on passage from Aruba to Rotterdam discovered damage to cargo pumps allegedly in consequence of manufacturer's defect. Six cargo pumps removed, reconditioned or renewed.				
April 16, 1971 Grounding, Contact Damage	?	As AMY MULTINA, Liberian Flag, while drydocking at Genoa, vessel reported grounding and contact damage and requested attendance of surveyors. No other details provided.				

(Casualties cont'd on next page)

REPORTED CASUALTIES TO LIQUEFIED GAS CARRIERS ABOVE 5000 CBM

VESSEL NAME	CUBIC METERS	FLAG	OWNERS	YEAR BUILT	TANK TYPE: TEMP. C
DANIAN GAS cont'd					
Oct. 10, 1973 Fire in Deck Pump — In Port	As DANIAN GAS, while discharging propane at Donges, France, deck pump caught fire. Vessel had discharged about 900 tons of propane at time of fire. 14,000 tons of propane were on board. Refinery firemen extinguished the fire in 30 minutes. For safety sake the vessel was towed to sea. Void spaces were inerted, the defective pump repaired, vessel returned to port and completed discharging.				
DELTAGAS	5,500	West German	Sloman Neptun	1975	S-48
Jan. 15, 1977 Hit Lock Gate — In Port	When entering locks at Brunsbuttel, W. Germany, contacted lock gate which damaged. Vessel, loaded with butadiene for United States, apparently undamaged and proceeded. No additional details available.				
March 17, 1981 Disabled — At Sea	En route from Porsgrunn to Split, disabled off Cape St. Vincent on March 17, 1981. Towed to Split and thence to Zadar where repairs effected. Returned to service. No details of damages reported.				
DEVONSHIRE	52,650	British	Bibby Bulk Carriers	1974	R-48
Jan. 23-24, 1975 Ranging Damage — In Port	Damaged shell plate against fender at Corunna, Spain, and also touched bottom, probably at the dock, due to swell. An estimated 80 tons of steel required replacement or repair. Starboard shell plating indented at 7 locations in way of Nos. 1, 2, 3 and 4 cargo tank void containment spaces. The starboard bottom plating set up with damages to internals in way Nos. 4 and 5 double bottom tanks below No. 4 cargo tank.				
Feb. 7, 1975 Tug Contact — In Port	Contact with Tug Ursus Quinto at Carthagena. Starboard shell plating indented in way of No. 2 cargo tank void containment space.				

(Casualties cont'd on next page)

REPORTED CASUALTIES TO LIQUEFIED GAS CARRIERS ABOVE 5000 CBM

VESSEL NAME	CUBIC METERS	FLAG	OWNERS	YEAR BUILT	TANK TYPE: TEMP. C
DEVONSHIRE cont'd					
Feb. 26, 1975 At Sea Explosion Main Engine	Explosion in main engine exhaust trunk during passage from Tarragona, Spain, to Gibraltar. Forward main engine turbo-blower turbine blades distorted and fractured in way of bonding wire holes and diffuser ring distorted and scored. Turbine to reblade and diffuser ring renew.				
Aug. 12, 1978 At Sea Hull Damage Transferring Cargo at Sea	While transferring cargo while drifting off Crete, contacted GARMULA. Starboard sheerstrake and deck stringer badly buckled and fractured in way of after accommodation space with internal structures in way, also upper deck bulwark set in and buckled over 12 meters. Some sounding pipes and lining panels of three cabins affected. No damages GARMULA.				
Dec. 3, 1978 At Sea Generator Damage	At Izmit, Turkey, surveyed extensive damage to engine driving generator which required renewal of cracked engine cylinder block as well as renewal of liners and pistons, etc. of Nos. 7 and 8 cylinders.				
DISCARIA	22,240	Liberian	Discaria Shipping	1969	R-48
Nov. 9, 1977 At Sea Engine Trouble	As FERNVALLEY, Norwegian Flag, anchored in Mevagissey Bay, South coast of England, overnight with engine trouble. No other details given.				
Feb, 6, 1978 In Port Hit Canal Bank	As FERNVALLEY, Norwegian Flag, during transit of Panama Canal, in ballast, Denmark for Los Angeles, California, struck canal bank. Berthed at Balboa for 3 days for temporary repairs and then proceeded.				
Sept. 1980 ? Engine Damage	As DISCARIA, machinery damage to emergency generator and alterator engines. First surveyed in Ras Tanura in October. Subsequent damages and repairs to units recurred through November. Vessel towed as "dead ship" to Bahrain for final repairs November 10.				

(Casualties cont'd on next page)

REPORTED CASUALTIES TO LIQUEFIED GAS CARRIERS ABOVE 5000 CBM

VESSEL NAME	CUBIC METERS	FLAG	OWNERS	YEAR BUILT	TANK TYPE: TEMP. C
DISCARIA cont'd					
Feb. 24, 1981 In Port Hull Damage	No. 2 void space water detection alarm activated at No. 5 LPG terminal, Suez on February 24, 1981. Surveyed at Leghorn on May 10, 1981. Sailed May 13, 1981 for drydock at North Shields. Damp perlite noted at after end of No. 2 void space.				
July 22, 1981 At Sea Cylinder Liner Broken	Reported No. 1 cylinder liner broken, off Brindisi on July 22, 1981. Repaired at Brindisi.				
EIRIK RAUDE	6,170	Norwegian	Einar Bakkevig	1967	S-40
Aug. 23, 1975 In Port Explosion & Fire; CONSTRUCTIVE TOTAL LOSS	As MUNDOGAS BERMUDA, Norwegian flag, explosion in boiler followed by fire while discharging vinyl chloride at Cartagena, Col. Colombian Navy and local fire department assisted with 80 firemen fighting the blaze. The vessel was towed from the wharf still afire. Cargo seemed to be undamaged by the fire. Two crew were dead and ten injured. Fire produced severe damage to engines, accommodations and bridge structure. Causes of fire not stated. In December declared a CTL and towed to Kristiansand S., Norway, for 3 months repairs.				
July 11, 1981 At Sea Lost Loose Rudder	As EIRIK RAUDE, enroute from Salvador, Brazil to Plaquemine (USA) with propylene oxide cargo, reported rudder loose off Natal July 11, 1981 and subsequently lost rudder July 13, 1981. Towed to Willemstad and thence to Punta Camacho for part discharge. Towed back to Willemstad where repairs effected. Returned to service.				

(Casualties cont'd on next page)

REPORTED CASUALTIES TO LIQUEFIED GAS CARRIERS ABOVE 5000 CBM

VESSEL NAME	CUBIC METERS	FLAG	OWNERS	YEAR BUILT	TANK TYPE: TEMP. C
EL PASO COLUMBIA	125,000	American	El Paso	1975	
Dec. 16 1981 At Sea Stranded	Enroute from Boston to Halifax in ballast, stranded at Cape Sable Island on December 17, 1981 after breaking tow on December 16, 1981 in heavy weather. Refloated with tug assistance at 1800 hrs. on December 23, 1981 and towed to Halifax. Engine room flooded to depth of 20 ft. Starboard bunker tank ruptured and rudder apparently out of alignment. Ninety percent of double bottoms breached.				
EL PASO CONSOLIDATED	125,000	Liberian	El Paso Consolidated Tanker	1977	I-165
April, 1979 ? Membrane Damage	Left Savannah, GA, for Arzew, Algeria April 1, 1979, was reported April 5th bound Dunkirk, France for repairs to membrane damage. Localised areas of buckling affecting the tank crown, side bulkheads and forward and aft transverse bulkheads in addition to damage to lower surfaces. Vessel sailed from Dunkirk December 23.				
EL PASO HOWARD BOYD	126,540	American	El Paso Howard Boyd Tanker	1979	I-165
June 7, 1979 In Port Stranded Due Steering Failure.	Enroute down Chesapeake Bay for sea trials before being delivered, went aground in the York Spit Channel, caused by the failure of a hydraulic pump that controls the vessel's rudder. She was refloated 2-1/2 hours later. Vessel, in ballast, apparently was not damaged.				
June, 1980 In Port Hit Bottom, Grounded.	Grounded due to breaking adrift from dock in Hampton Roads. Diver examination on June 17 found no damage.				

(Casualties cont'd on next page)

REPORTED CASUALTIES TO LIQUEFIED GAS CARRIERS ABOVE 5000 CBM

VESSEL NAME	CUBIC METERS	FLAG	OWNERS	YEAR BUILT	TANK TYPE: TEMP. C
EL PASO PAUL KAYSER	125,000	Liberian	El Paso Paul Kayser Tanker	1975	I-165
June 29, 1979 At Sea Stranded, Ladened, Straits of Gibraltar	Stranded in the Straits of Gibraltar after avoiding a collision, ladened with 99,500 cubic meters of LNG. Fog prevailed at time of stranding. Heavy bottom damage. Starboard side and bottom wing tanks tidal. July 4, vessel refloated and anchored Algeciras Bay where all cargo was transferred to EL PASO SONATRACH. Early estimate suggest 2,500 tons of steel needed to repair vessel at cost to top $20 million mark. Vessel anticipated return to service early 1980.				
EL PASO SOUTHERN	126,540	American	El Paso Southern Tanker	1978	I-165
March 29, 1978 In Port Steering Failure	After departing shipyard Newport News, VA, for sea trials, stranded James River for approximately 2 hours. Problem reported minor steering malfunction. Damages, if any, not reported.				
Jan. 4, 1979 In Port Lost Anchor	While entering St. Nazaire, France, lost part of starboard anchor at anchorage. Anchor was broken. Spare anchor available on board.				
EPSILONGAS	5,600	West German	Sloman Neptun	1977	S-48
Sept. 1978 In Port	Was delayed with engine failure in Langesund, Norway ladened with 5,000 tons of vinyl chloride and spent some time anchored close to town. Several days later resumed voyage to South America. No other details provided.				

(Casualties cont'd on next page)

REPORTED CASUALTIES TO LIQUEFIED GAS CARRIERS ABOVE 5000 CBM

VESSEL NAME	CUBIC METERS	FLAG	OWNERS	YEAR BUILT	TANK TYPE: TEMP. C
ESSO PUERTO RICO LPG/OIL	12,788	Panamanian	Exxon International Co.	1959 Retired: 1976	P
Aug. 26, 1966 Boiler Trouble Broke Down at Sea — At Sea	Broke down at sea off South American East Coast. Towed for a while by tug Angostura then by ESSO EXETER, with tug standing by. The tow parted after five days of towing and both the ESSO EXETER and the ESSO PUERTO RICO entered Rio de Janeiro, former with generator trouble and later with boiler trouble. ESSO PUERTO RICO finally arrived at its destination, Buenos Aires, end of September.				
FARADAY	31,215	British	Ocean Gas Transport	1971	R-45
Oct. 25, 1970 Fire at Fitting Out Berth — In Port	A fire occurred in No. 1 tank at fitting out berth, believed due to welding operations which caused smouldering among two or three planks causing dense smoke. There was no damage to tank or ship.				
July 28, 1971 Insulation Contaminated — In Port	While entering Buenos Aires was contacted by a tug assisting another vessel and sustained shell plating damage. Fuel tank bulkhead fractured and some 30 tons of fuel leaked and contaminated 3,500 sq. ft. of six-inch thick glass-fibre insulation on double bottom tank top in way of No. 1 cargo tank space rendering same useless. Bulkhead failure due inefficient welding, which failed. Vessel sailed next day.				
May 9, 1973 Grounding: Pump Damage — ?	At Singapore agents requested survey of grounding and cargo-pump damage. No details of either casualty provided.				
July 20, 1979 Turbo-Blower Damage — ?	When blowers opened up for routine examination at Genoa, Italy, found main-engine turbo-blower rotors damaged requiring to be rebladed. Date and cause of damage unknown.				

(Casualties cont'd on next page)

REPORTED CASUALTIES TO LIQUEFIED GAS CARRIERS ABOVE 5000 CBM

VESSEL NAME	CUBIC METERS	FLAG	OWNERS	YEAR BUILT	TANK TYPE: TEMP. C
FERNWAVE	12,000	Liberian	Shipfern Gas Corp.	1972	S-48
May 6, 1973 In Port Hit while Moored to Dock	While moored at Houston, Texas, was hit by motor bulk carrier COSMOS FOMALHAUT. Survey revealed gas carrier had extensive damage to port shell and internal members, also damage to starboard shell due contact with wharf at time of collision, necessitating renewal about 20 tons of steel. Vessel drydocking at Galveston for repairs. Other vessel surveyed for damages but no report given of result of survey.				
Nov. 17, 1973 At Sea Engine Room Fire	Fire in engine room off East coast of England reportedly after fuel line in engine room exploded. Part crew taken off by Royal Fleet Auxiliary tank Olwen. Later towed to River Humber by tug. Damage reported to main engine, generators and cargo cooling system. Proceeded to Gothenburg, Sweden, for 3 weeks of repairs.				
GADILA	75,080	British	Shell Tankers (U.K.)	1973	I-162
Jan. 1979 ?	Survey requested at Kobe, Japan, in respect of propeller damage sustained about three months earlier. No other details.				
GALILEO	14,760	Chilean	Naviera Interoceangas S.A.	1967	R-45
May 28, 1968 In Port Stranded in River	As CERONS, French flag, inbound from Middlesbrough, U.K., grounded. In dense fog in River Scheldt off Saaftinge, Belgium, and was refloated about 9 hours later. No report of any damages.				
Jan. 21, 1972 ? Replaced Generator	As ZENON, Panamanian flag, #3 diesel generator was replaced at Rouen after it exploded at unstated location. No other details.				

(Casualties cont'd on next page)

REPORTED CASUALTIES TO LIQUEFIED GAS CARRIERS ABOVE 5000 CBM

VESSEL NAME	CUBIC METERS	FLAG	OWNERS	YEAR BUILT	TANK TYPE: TEMP. C

GALILEO cont'd

Feb. 1972 Heavy Weather Damages	At Sea	As ZENON, Panamanian flag, many pipes and valves fractured on deck and in engine room, four small cracks on deck over #3 tank, Honeywell and Whessoe gauges damaged, anchor cable twisted, electric crane in engine room dropped on engine top platform, making big dent, main engine indicator damaged and many other small damages due encountering heavy weather on voyage from Petit Couronne to Venezuela. Necessary remove 1,100 cubic meters of insulation in order to repair deck plating, locate source of leakage. Insulation contaminated with ammonia.
Aug. 16, 1972 Cargo Pump Repairs	?	As ZENON, Panamanian flag, reported to have cargo pump damage and apparently made repairs at Maracaibo. No details of the cause or nature of damage.
Dec. ?, 1972	At Sea	As ZENON, Panamanian flag, encountered heavy weather and water and gas were found in the insulating spaces in way of Nos. 1 and 2 cargo tanks and gas found in all three insulating spaces. Extensive gas freeing required before full extent of damages could be ascertained at Marseilles. Cargo tanks were lifted up. Cracks found in double bottom tank tops. Approximately 3,300 cubic meters of insulation required replacement. Extensive distortion of floor platings. Repairs took about 180 days or more.
June 29, 1973 Collision	At Sea	As ZENON, Panamanian flag, while proceeding from Kashima to Mizushima, Japan, to complete loading, struck mine-sweeper Koshiki 615, in heavy fog off East coast of Honshu Island in lat. 35 05 48N, long. 140, 25 48E. Apparently two crew members of mine sweeper were injured but not seriously. Zenon proceeded to Mizushima with leaks in the forepeak and indents in the starboard bow plates. Both sides of the stem were slightly holed and dented.
Oct. 1, 1973 Rudder Damage	At Sea	As ZENON, Panamanian flag, sailed on September 26 from Havre for Houston, but returned with rudder damage. Vessel sailed two days later after replacing main steering pump port side.

(Casualties cont'd on next page)

REPORTED CASUALTIES TO LIQUEFIED GAS CARRIERS ABOVE 5000 CBM

VESSEL NAME	CUBIC METERS	FLAG	OWNERS	YEAR BUILT	TANK TYPE: TEMP. C

GALILEO cont'd

Mar. 15, 1975 Contact Damage	In Port	As GALILEO, Liberian flag, at Marseilles with contact damage sustained at unstated place and time. Port side shell plating badly indented in way of sea chest in #1 port wing tank. Two shell plates to be cropped and part renewed.
May 30, 1975 Cargo Pump Trouble	In Port	As GALILEO, Liberian flag, at Punta Arenas, Chile, with No. 1 port side tank cargo pump damaged due lack of lubrication and evaporization of liquid in pump. Unable discharge No. 3 tank with syphon and pressure system. Vessel to trade with Nos. 1 and 2 tanks only.
March 8, 1976 Lost Anchor & Chain	In Port	As GALILEO, Chilean flag, lost anchor and 9 shackles of chain in vicinity of Recalada pilot station entrance to Buenos Aires.
Aug. 2, 1976 Lost Power, Drifted, Grounded	In Port	As GALILEO, while maneuvering to anchor in Quintero Bay, Chile, reported drifting and subsequently grounded. No. 1 starboard double bottom tank sprung leak and repaired with cement box. Internal examination revealed about 40% of bottom plating within amidship's half length with stiffeners and floors set up.
Aug. 2, 1977 Fire	At Sea	As GALILEO, fire on board, in unstated location, while in Concepcion Channel abeam Charles Island, Chile. Vessel spent four days at Punta Arenas. No further mention of fire or damages.
Feb. 14, 1978 Generator Damage	At Sea	As GALILEO, No. 1 auxiliary engine connecting rod failed and caused severe damages. Engine block, crankcase, crankshaft, two cylinder liners and pistons required extensive repairs of renewals. Generators Nos. 2 and 3 examined in parallel and found satisfactory until 3rd unit can be repaired.

(Casualties cont'd on next page)

REPORTED CASUALTIES TO LIQUEFIED GAS CARRIERS ABOVE 5000 CBM

VESSEL NAME	CUBIC METERS	FLAG	OWNERS	YEAR BUILT	TANK TYPE: TEMP. C
GAMBADA	29,791	British	P. & O. Steam Nav. Co.	1973	R-51
Feb. 28, 1975 ? Diesel Generator Damage	No. 3 auxiliary engine damaged. Crankshaft, bedplate, one set of main bearings and one set of bottom end bearings required repair or replacement. No cause of damage given.				
March 21, 1975 ? Diesel Generator Damage	No. 2 auxiliary diesel engine required dismantling and rebuilding many components. Cause of damage not stated. Repairs are to be effected at sea by the crew.				
Sept. 16, 1977 At Sea Diesel Generator Damage	No. 2 auxiliary engine damaged on voyage from Buenos Aires to Maracaibo. Two bearings seized and crankshaft considered beyond repair. A team from the manufacturers fitted a new crankshaft and bearings.				
March 12, 1979 In Port Steering Failure	Departing from Sloehaven, Netherlands for Rotterdam, steering gear jammed 20 degrees to port and towed to Flushing anchorage, then towed to repair yard. Particles of case iron found in hydraulic oil system.				
GAMBHIRA	14,103	British	P. & O. Steam Nav. Co.	1969	R-48
June 16, 1973 In Port Cargo Pump Damages	While discharging at Corpus Christi, Texas, port and starboard discharge pumps in No. 2 cargo tank sustained damages. At Curacao pumps landed ashore and sent to makers in France.				

(Casualties cont'd on next page)

REPORTED CASUALTIES TO LIQUEFIED GAS CARRIERS ABOVE 5000 CBM

VESSEL NAME	CUBIC METERS	FLAG	OWNERS	YEAR BUILT	TANK TYPE: TEMP. C
GAMBHIRA cont'd					
Dec. 26, 1974 Insulation Damages	?		Double bottom tank top insulation below No. 2 cargo tank damaged. Found wet with water about six inches deep at aft end. Insulation over whole area of tank top buckled and bulged to height of 18 inches with rubber sheet seal torn and insulation broken/washed out. No. 1, 3 and 4 tank tops also have insulation bulged and distorted.		
March 4, 1975 Rudder Damage	At Sea		Diverted to Honolulu rudder repairs. While loaded with cargo of ammonia, experienced rudder bearing trouble. At Honolulu the bearing was replaced. Cause not stated.		
April 13, 1976 Two Lifeboats Damaged	In Port		While at Gibraltar for orders, No. 1 lifeboat, returning to vessel, became entangled with a rope trailing from the lifeboat. No. 2 lifeboat was launched to go to the assistance, but her propeller also became jammed by rope. Both lifeboats grounded and pounded on the rocks at the seaward end of the North Mole. Both lifeboats were badly damaged and were replaced.		
April 1980 Compressor Damage	In Port		Cracked LPG compressor cylinder block reported on arrival Bombay. Cause of damage unknown.		
Aug. 9, 1981 Engine Trouble	At Sea		Sustained engine trouble during ballast voyage from Tyne to Cartagena on August 9, 1981. Taken to Falmouth and berthed Falmouth docks August 10, 1981 for repairs. Sailed Truro September 16, 1981 for Tees.		

(Casualties cont'd on next page)

REPORTED CASUALTIES TO LIQUEFIED GAS CARRIERS ABOVE 5000 CBM

VESSEL NAME	CUBIC METERS	FLAG	OWNERS	YEAR BUILT	TANK TYPE: TEMP. C
GAMMAGAS	5,202	Panamanian	Balboa Chartering Corp.	1972	C-48
Sept. 17, 1978 At Sea Machinery Trouble	Enroute to Havre, France, for Port Neches, Texas, put in Bermuda with machinery damage. No. 7 air inlet valve seat dropped out of cylinder cover and was broken in pieces between piston cover. Pieces of seat ring and valve found in Nos. 8, 9, 10, 11 and 12 cylinders. No. 7 and 8 units new liners, pistons and valves seats fitted, turbo-charger rotor, nozzle diaphragm and bearings renewed.				
Feb. 11, 1981 At Sea Stranded River Parana	Enroute to San Lorenzo stranded KM 149.5, River Parana on February 11, 1981, refloated but stranded again February 12, 1981 due to steering problems, refloated and anchored; towed to San Lorenzo for discharge and thence to Buenos Aires for drydocking and repairs. Spade shaped rudder found broken and 95 percent missing.				
GANDARA	22,500	British	P. & O. Steam Nav. Co.	1976	R-50
April 5, 1978 At Sea Windlass Problems	Enroute Shuaiba, Kuwait for Donges, France, reported windlass problems. Damage probably due to seawater ingress into oil of windlass hydraulic system. Port and starboard windlass fitted with new pumps.				
May 22, 1981 At Sea Machinery Damage	Enroute to Taiwan sustained machinery damage off Porsgrunn on May 22, 1981. Taken to Rafnes for repair. Found Nos. 1, 3 cylinder liners badly cracked in way upper cooled part.				

(Casualties cont'd on next page)

REPORTED CASUALTIES TO LIQUEFIED GAS CARRIERS ABOVE 5000 CBM

VESSEL NAME	CUBIC METERS	FLAG	OWNERS	YEAR BUILT	TANK TYPE: TEMP. C
GARALA	54,220	British	P. & O. Steam Nav. Co.	1979	R-50
Aug. 29, 1981 At Sea Lost Port Anchor	Reported lost port anchor and cable 2.7 miles NW of entry buoy to Ras Tanura in 55 meters on August 29, 1981. Total weight reported 55 tons. New anchor and cable fitted after survey at Antwerp.				
GARBETA	22,764	British	P. & O. Steam Nav. Co.	1975	R-48
March 25, 1980 ? Heavy Weather Damage	Heavy weather damage repairs effected at Marseilles after voyage from Port de Bouc. Vessel sailed April 8, but returned three days later after discovery of further damage to double bottoms.				
GARINDA	54,220	British	P. & O. Steam Nav. Co.	1977	R-50
Jan. 15, 1978 In Port? Stranding	Went aground north of Suez loaded with 30,000 tonnes of liquid gas from Ras Tanura, Saudi Arabia to Izmir, Turkey. Refloated 5 hours 35 minutes later and resumed transit of Suez Canal. No damages reported.				
July 10, 1979 In Port Standing at Buenos Aires Entrance	Stranded, part laden with gas, at South Entrance Channel to Buenos Aires. Fifty-three hours later refloated with rise of river and tug assistance. Survey revealed no apparent damage due to the grounding.				

(Casualties cont'd on next page)

REPORTED CASUALTIES TO LIQUEFIED GAS CARRIERS ABOVE 5000 CBM

VESSEL NAME		CUBIC METERS	FLAG	OWNERS	YEAR BUILT	TANK TYPE: TEMP. C
GARINDA cont'd						
Dec. 30, 1981 Heavy Weather Damage	At Sea	Sustained heavy weather damage during ballast voyage from Rotterdam to Port Said between December 26-30, 1981. Arrived Bahrain January 14, 1982 and sailed January 15, 1982 for Ras Tanura. Crack in weld connection between cofferdam bulkhead/vertical duct and shell plating starboard side and in cofferdam plating.				
GAS AL BURGAN		72,100	Kuwait	Kuwait Oil Tanker Co.	1979	R-46
July 1980 Shell Damage	?	Alleged shell damage s/side. Cause and date unknown. Three shell plates partly renewed. Repairs effected at La Ciotat in July.				
GAS ENTERPRISE		70,900	British	BP Shipping Ltd.	1977	R-46
March 1980 Pump Damage	At Sea	As RAZI, Iranian flag, incurred damage to cargo pump of No. 3 port cargo tank while enroute from Ras Tanura. Survey revealed damage to vertical suction pipe assembly and transmission shaft, plus small indentation at bottom of tank.				
GAS GEMINI		77,960	Liberia	Mitsubishi Corp.	1977	R-45
April 15, 1981 Lost Propeller Blade	At Sea	Reported lost one propeller blade during voyage from Ju'Aymah terminal to Japan on April 15, 1981. Towed to Ishinomaki where arrived April 23, 1981 and thence to Yokohama where repairs effected. Returned to service.				

(Casualties cont'd on next page)

REPORTED CASUALTIES TO LIQUEFIED GAS CARRIERS ABOVE 5000 CBM

VESSEL NAME	CUBIC METERS	FLAG	OWNERS	YEAR BUILT	TANK TYPE: TEMP. C
GAS PILOT	11,842	Liberian	Nordic Gas Carrier Corp.	1968	R-50
Dec. 20, 1968 ? Cargo Pump Trouble	As GAS LION, Norwegian flag, at Santos, Brazil, reported necessary to replace submersible cargo pumps. Surveyor unable to sight pumps at Santos as they were immersed in cargo. No other information provided.				
July 28, 1975 At Sea Machinery Damage	As GAS LION, Norwegian flag, put in St. Michael's Ponta Delgada, Azores, with main engine damage, while enroute Rotterdam for Houston. Left St. Michael's 4 days later. No data on trouble.				
GAZANA	29,791	British	P. & O. Steam Nav. Co.	1972	R-51
Aug. 10, 1971 In Port Fire in Fitting Out Yard	While at the fitting out basin in Liverpool, a fire occurred in the insulation between the two skins of the hull of the vessel. It was restricted to one tank. It took firemen nearly eight hours to quell the blaze.				
Sept. 6, 1973 At Sea Machinery Damage	Put into Sydney, Australia, as a port of refuge as result of generator and compressor breakdown. Vessel carrying small quantity of cargo for tank-cooling purposes. Crankshafts Nos. 2 and 4 generator diesel engines damaged and bedplate of No. 2 damaged. Cause of damage unknown. Resumed voyage after one week in port.				
Nov. 14, 1974 ? Machinery Damage	No. 3 Diesel engine generator oil found emulsified. Several days later No. 3 bottom end bearing failed, severely scoring crankshaft and causing deflection of shaft. Repairs made at Kuwait.				
Feb. 25, 1975 At Sea Machinery Damage	No. 1 port generator engine connecting rod broke loose and piston seized in liner causing damage to unit. Diesel oil allegedly contaminated with fuel.				

(Casualties cont'd on next page)

REPORTED CASUALTIES TO LIQUEFIED GAS CARRIERS ABOVE 5000 CBM

VESSEL NAME		CUBIC METERS	FLAG	OWNERS	YEAR BUILT	TANK TYPE: TEMP. C
GAZANA cont'd						
March 23, 1975	At Sea	Stbd. generator engine apparently shut down on low lube oil alarm and evidence of overheating of bearings. Repairs were made at Buenos Aires.				
June 9, 1975 Contact Damage	In Port	While anchored in Buenos Aires Roads contacted by lightening vessel motor liquefied gas/oil tanker LAVOISIER. Both vessels sustained damages, apparently minor as GAZANA sailed next day for Cape Town.				
June 14, 1978 Diesel Generator Damage	At Sea	Enroute Bahrain for Leghorn, Italy, alleged sustained diesel generator damage. Crankshaft bent 0.3 mm in way of No. 8 journal from forward. All main bearings and crankpin bearings wiped, with Nos. 6 & 8 crankpins severely and coloured blue.				
Jan. 19-29, 1979 Main Engine Overloaded	?	Various cylinder covers cracked in way valve pockets, alleged due overload of engine. Nos. 1, 7, 5 & 4 failed on March 22, April 7, May 6 and May 8 respectively.				
Aug. 9, 1979 Main Engine Damage	?	At Santos, Brazil, surveyed and various parts of No. 2 cylinder found damaged, requiring replacement.				
Feb. 1980 Hit by Vessel While Moored	In Port	Contacted while moored at Montedison berth Porto Marghera by chemical carrier FERTON. Sustained three indents on port side sheerstrake of shell, not affecting seaworthiness. FERTON incurred minor damage. Both vessels deferred repairs.				
GAZ FOUNTAIN		40,232	Panamanian	Nital Trading & Shipping	1969	R-48
March 5, 1972 Cargo Pump Damages	?	As GAY LUSSAC, Panamanian flag, at Punta Cardon, Venezuela, reported two damaged sealed submerged liquefied petroleum gas cargo pumps being airlifted to manufacturers at Costa Mesa, California. Cause of type of damage not specified.				

(Casualties cont'd on next page)

REPORTED CASUALTIES TO LIQUEFIED GAS CARRIERS ABOVE 5000 CBM

VESSEL NAME	CUBIC METERS	FLAG	OWNERS	YEAR BUILT	TANK TYPE: TEMP. C

GAZ FOUNTAIN cont'd

March 15, 1972 ? Generator Regulator Problems		As GAY LUSSAC, Panamanian flag, difficulties experienced with generator No. 2 regulator. Over preceding six months all three generators have experienced similar troubles. Technicians from France adjusted the generator at Buenos Aires.
March 24, 1972 Hit Dock Wall	In Port	As GAY LUSSAC, Panamanian flag, when entering Buenos Aires with tug assistance, contacted dock wall, sustaining shell plate damage. No other details of damages.
Oct. 5, 1972 Cargo Pump Damage		As GAY LUSSAC, Panamanian flag, arrived Singapore Roads from Chiba, Japan, and requested survey on damage to No. 3 cargo pump, date and cause unknown. No details of damages.
Oct. 26-27, 1972 Ranging Damage	In Port	As GAY LUSSAC, Panamanian flag, due to heavy sea vessel repeatedly bumped against jetty at Sarroch, Sardinia, causing extensive damage to jetty and dolphins. Vessel apparently undamaged because it sailed the same day for Brazil.
Dec. , 1972 Heavy Weather Damages	At Sea	As GAY LUSSAC, Panamanian flag, enroute Mena al Ahmadi to Chiba, Japan, encountered heavy weather. Damage consists of fractured wing tank No. 1 stbd. inner bulkhead allowing ingress of ballast water into cargo tank insulation, which now completely destroyed. Main deck in way of cargo tank set up.
Nov. 26-28, 1974 Heavy Weather Damages	At Sea	As GAY LUSSAC, Panamanian flag, on laden passage from Kuwait to Mersin, Turkey, encountered heavy weather. Leakage through plating stiffener between No. 3 stbd. tank and No. 4 fuel oil double bottom. Two pumps No. 2 stbd. and No. 3 port cargo tanks with feed line insulation resistance to zero. Repairs carried out at Marseilles in January 1975.

(Casualties cont'd on next page)

REPORTED CASUALTIES TO LIQUEFIED GAS CARRIERS ABOVE 5000 CBM

VESSEL NAME	CUBIC METERS	FLAG	OWNERS	YEAR BUILT	TANK TYPE: TEMP. C

GAZ FOUNTAIN cont'd

March 18, 1975 Grounding	In Port	As GAY LUSSAC, Panamanian flag, examined in drydock at Durban, South Africa, and no damage found due grounding at unstated location.
Jan. 10, 1976 Cargo Pump Damages	?	As GAY LUSSAC, Panamanian flag, enroute Persian Gulf for Barcelona, Spain, tested cargo pumps and found out of 9, only 4 fixed pumps operable and 1 removable cargo pump inoperable. All 6 pumps to be sent back to Europe for repairs.
Feb. 22-25, 1978 Heavy Weather Damages	At Sea	As GAY LUSSAC, Panamanian flag, encountered heavy weather in June 1977 aggravated by further alleged heavy weather in February 1978. Nos. 4 & 5 port fuel tanks contaminated by salt water, Nos. 2 & 3 adjacent ballast tanks suspected damaged. Nos. 1 & 2 port ballast tanks and Nos. 1 & 2 starboard ballast tanks in communication. In addition fractures found in double bottom and in afterpeak. Repairs completed at Marseilles in March.
Dec. 12, 1979 Hit Submerged Object	At Sea	As GAY LUSSAC, Panamanian flag, while on part loaded passage from Bayway, N.J. to Philadelphia, PA, sustained hull damage due to striking a submerged object. A gouge 25 m in length, 35 cm in width and 6 cm in depth at turn of bilge, a 35 cm fracture in No. 1 ballast tank and No. 2 ballast tank flooded due to buckling of bulkhead in way.
Dec. 12, 1979 Hit Bottom, Grounded		As GAY LUSSAC, Panamanian flag, was surveyed afloat at Marcus Hook, Pa. with respect to grounding. Partloaded Bayway for Philadelphia. Bottom plating at turn of bilge portside in way of nos. 1 and 2 ballast tanks gouged.
Sept. 1980 Hit Bottom, Grounded	In Port	As GAY LUSSAC, Panamanian flag, grounding alleged when berthing at Antwerp. Refloated 75 minutes later. Continuous loss of oil from aft simplex seal and continual refilling of oil header tank. Survey to be made during drydocking at St. Nazaire in early January.

(Casualties cont'd on next page)

REPORTED CASUALTIES TO LIQUEFIED GAS CARRIERS ABOVE 5000 CBM

VESSEL NAME	CUBIC METERS	FLAG	OWNERS	YEAR BUILT	TANK TYPE: TEMP. C
GAZ FOUNTAIN cont'd					
Dec. 1980 Heavy Weather Damage — At Sea	As GAY LUSSAC, Panamanian flag, incurred heavy weather damage enroute from Ras Tanura to Marseilles. Flooding of forecastle space due to tearing away of chain spurling pipe cover. Electric cables, pump motors, fittings, fire-extinquisher system damaged. Temporary repairs effected in Marseilles to enable vessel to continue trading in a seaworthy condition.				
May 15, 1981 Engine Room Fire; Cargo Transshipped — At Sea	As GAZ FOUNTAIN, while proceeding from Kalamata to Buenos Aires with propane/butane cargo, engine room caught fire 15 miles off Cherchell on May 15, 1981. Abandoned by crew. Fire later burned itself out and crew returned; subsequently towed to Fos where cargo transshipped and thence to Hamburg for repairs. Returned to service. General washing down of engine spaces lasted about 1 week after which demolishing of control room started. After 2 independent chemical analyses of PVC cables, further renewals in engine room, due to contamination by hydrochloric acid, will be necessary. Various electrical motors may require renewal. Further buckling of steel structure evident. Vessels 9 cargo pumps in tanks required removal, dry-stoved and sealed in nitrogen filled plastic bags with silicon gel.				
GEOMITRA	77,731	British	Shell Tankers (U.K.)	1975	I-162
July 5, 1974 Fire While Under Construction — In Port	While under construction at Marseilles, fire broke out in No. 5 tank and was smothered under carbonic foam and temperature back to normal 4 days later. Cause and extent of damage will be ascertained later. No other data.				
July 1980 Generator Damage — At Sea	Port diesel generator damaged, enroute from Chiba to Lamut. Details unknown. Vessel surveyed in Chiba and sailed July 26 for Yokohoma.				

(Casualties cont'd on next page)

REPORTED CASUALTIES TO LIQUEFIED GAS CARRIERS ABOVE 5000 CBM

VESSEL NAME	CUBIC METERS	FLAG	OWNERS	YEAR BUILT	TANK TYPE: TEMP. C
GOULDIA	75,000	British	Shell Tankers (U.K.)	1975	I-162
Aug. 4, 1977 Machinery Damage	?	Due Osaka, Japan, and reported damage to the port generator. No other details.			
GUARUJA	6,200	Brazilian	Petroleo Brasileiro	1981	R-5
Aug. 8, 1981 Contact Damage	In Port	Contacted pier while berthing at Montevideo on August 8, 1981 in strong winds. Indentation and fissure 10MM x 110MM in shell plating. Temporarily patched with cement box.			
HAMPSHIRE	52,650	British	Britain Steamship Co. Ltd.	1974	R-48
Oct. 12, 1976 Heavy Weather Damages	At Sea	Surveyed in drydock at Skaramanga, Greece, in respect of heavy weather damages allegedly sustained while riding out a typhoon on passage from Mena al Ahmadi to Japan. No details of the damages provided.			
April 13, 1978	At Sea	Enroute Lyngs Odde, Jutland, Denmark, to Dubai, No. 3 generator damage apparently due to failure of thrust bearing. Engine to be stripped down and rebuilt, using new crankshaft, complete set of bearings and bedplate.			
Feb. 25, 1979 Lost Port Anchor	In Port	At Flushing, Netherlands, lost port anchor and chain. Spare anchor connected to remaining five lengths of chain at Gothenburg, Sweden.			

(Casualties cont'd on next page)

REPORTED CASUALTIES TO LIQUEFIED GAS CARRIERS ABOVE 5000 CBM

VESSEL NAME		CUBIC METERS	FLAG	OWNERS	YEAR BUILT	TANK TYPE: TEMP. C
HAMPSHIRE cont'd						
Nov. 1979 Heavy Weather Damage	At Sea	Enroute New Orleans, LA, for Turkey, with cargo of ammonia, put in Malta for emergency repairs to cracks to shell plating and frames, apparently due to heavy weather. Ship side plating subjected to heavy and dangerous panting. There is possibility that further damage was caused by contact with sandbank in River Mississippi.				
HARDANGER		7,418	Norwegian	Westfal-Larsen & Co. A/S	1972	S-104
Jan. 16, 1978 Collision with Tug, Tug Crewman Lost	In Port	Outbound Houston Ship Channel collided with harbour tug MARS, which was assisting loaded steam tanker ESSO BARCELONA into berth at Exxon refinery, Baytown. One crewman of tug lost. No report of damages, if any.				
HASSI R'MEL		40,109	Algerian	Algerienne, Cie. Nationale	1971	I-160
Oct. 28, 1974 Stranding	At Sea	Stranded off Faraman Lighthouse in the Rhone Delta loaded with 40,000 cubic meters of liquid gas. Was pulled off the next evening and proceeded to Fos, France, to discharge. Stranded on sand bottom and inspection revealed no damages. (Vessel was carrying LNG at time of casualty.)				

(Casualties cont'd on next page)

REPORTED CASUALTIES TO LIQUEFIED GAS CARRIERS ABOVE 5000 CBM

VESSEL NAME	CUBIC METERS	FLAG	OWNERS	YEAR BUILT	TANK TYPE: TEMP. C
HAVIS	15,285	Norwegian	A/S International Gas Carriers	1970	R-48
June 3, 1976 ? Rudder Damage	At Singapore survey requested of rudder damage. No indication of cause or extent of damages.				
April 12, 1978 ? Bent Propeller Blades	At Gibraltar, while awaiting arrival of gas tanker LINCOLNSHIRE to load ammonia, crew carried out own repairs to bent propeller blades. No cause of damage stated.				
Feb. 23, 1981 At Sea Machinery Damage	Sustained machinery damage during loaded voyage Houston to Suez on February 23, 1981. Subsequently arrived outside the port of Lisbon and thence taken in tow to Marseilles where repairs effected and vessel returned to service. Broken rudder shaft and possibly lost rudder.				
HILLI	126,227	Liberian	Gotaas-Larsen	1975	I-163
Dec. 12, 1975 At Sea Propeller Damage	During her builder trials damage occurred to the propeller. The vessel had no business at that time and therefore, was laid up at Stavanger in January after her delivery. The repairs were eventually made at Hamburg and took about two weeks. The cause and nature of the repairs were not stated.				
May 14, 1977 In Port Bolt in Cargo Line	While discharging her first cargo at Chiba, Japan, metal objects were discovered in the cargo lines and discharging was suspended. The vessel was put out to sea to determine if there were any other foreign bodies in the cargo lines. The vessel arrived back at Chiba 55 days later and left the next day for outside Tokyo Bay with no explanation for the overnight visit. It arrived back at Chiba 37 days later and apparently discharged and sailed for Das Island, Persian Gulf three days after last arrival.				

(Casualties cont'd on next page)

REPORTED CASUALTIES TO LIQUEFIED GAS CARRIERS ABOVE 5000 CBM

VESSEL NAME	CUBIC METERS	FLAG	OWNERS	YEAR BUILT	TANK TYPE: TEMP. C
HILLI cont'd					
July 28, 1978 ? Propeller Damage	Arrived Das Island, U.A.E. from Sasebo, Japan and discovered propeller damage. Put in Singapore August 31, for survey of damages. No other details provided.				
HOEGH GANDRIA	125,820	Norwegian	Leif Hoegh & Co. A/S	1977	I-163
Dec. 23, 1977 In Port Contact while Moored	While lying at yard quay at Kiel, W. Germany, was contacted by floating crane Hebe II which was manoeuvering in yard. Gas carrier damaged and was repaired in yard. Crane apparently undamaged. No details of damages to gas carrier.				
HOEGH SHIELD	8,610	Norwegian	Leif Hoegh & Co. A/S	1969	S-47
Jan. 25, 1974 In Port Contact Damages	Anchor chain of gas carrier fouled propeller of motor vessel ALKMAN while both were apparently anchored at New Orleans. Contact occurred between the vessels subsequent to the fouling of the propeller. Other vessel surveyed in drydock at New Orleans. Gas carrier left 6 days after arrival. No apparent damages.				
Feb. 14, 1979 In Port Stranded in Port	Enroute Brazil for Buenos Aires reported grounded at B.A. south entrance channel. Vessel refloated next evening and proceeded B.A. No other details.				
Oct. 31, 1979 In Port Blackout	Sustained blackout at Brevik, Norway, outbound at Penang, loaded but assisting tug has situation under control. Anchored Eidanger Fjord and repairs performed, then proceeded.				

(Casualties cont'd on next page)

REPORTED CASUALTIES TO LIQUEFIED GAS CARRIERS ABOVE 5000 CBM

VESSEL NAME	CUBIC METERS	FLAG	OWNERS	YEAR BUILT	TANK TYPE: TEMP. C
HOEGH SKEAN	52,000	Norwegian	Leif Hoegh & Co. A/S	1971	R-48
Nov. 22, 1976 At Sea Machinery Damages	As HOEGH MULTINA, Norwegian flag, arrived Cape Town on voyage from Santos, Brazil to Westernport, Australia and agents reported turbo-blower trouble and leaking safety valves. Vessel sailed two days later.				
Nov. 1980 At Sea Hit Bottom, Grounded	As HOEGH SKEAN, grounded Shah Allum shoal enroute from Terneuzen to Ras Tanura in ballast. Refloated under own power the same day. Arrived Bahrain November 13 for repairs of 2-3 week duration.				
HUMBOLDT	6,327	British	Ocean Gas Transport	1968	S-45
Oct. 21, 1969 At Sea Explosion while Cleaning	While gas-freeing tanks at sea enroute Carthagena to Huelva, Spain, an explosion occurred in the pumproom deckhouse, resulting in No. 1 after condenser waterbox being blown off with attached piping. Deckhouse side plating and stiffeners buckled. Condenser shell distorted and tube plate bent, resulting in flooding of pumproom. Ventilating trunk partially collapsed. Put in Cadiz, Spain, for 3 days.				
June 27, 1970 At Sea Engine Trouble	Put in Falmouth, England, for 2 days with engine trouble. Vessel was enroute Antwerp for Santander, Spain, with a cargo of liquid gas.				
Sept. 18, 1974 In Port Hit Lock Gate	When entering locks at Brunsbuttel, Kiel Canal, contacted lock gate and caused extensive damage to the latter. The vessel was only slightly damaged and proceeded. Vessel was on voyage from Riga, USSR to Le Havre at time of incident.				

(Casualties cont'd on next page)

REPORTED CASUALTIES TO LIQUEFIED GAS CARRIERS ABOVE 5000 CBM

VESSEL NAME	CUBIC METERS	FLAG	OWNERS	YEAR BUILT	TANK TYPE: TEMP. C	
HUMBOLDT cont'd						
April 7, 1975 Hit Canal Bank		In Port	On voyage from Le Havre to Riga, USSR, in ballast, struck Kiel Canal. Vessel proceeded with seaworthiness certificate. No details of damages, if any.			
Aug. 28, 1975 Hit Light Mast in Canal		In Port	On voyage from Riga, USSR for Le Havre, with a cargo of gas, damaged light mast in siding at Audorf in Kiel Canal. Vessel proceeded undamaged.			
Oct. 7, 1976 Machinery Trouble; Ice Damages		At Sea	On voyage from Riga, USSR for Antwerp, anchored at Sunk with engine failure. When weather became more clement proceeded to Felixstowe, England to take aboard stores, engineers and effect necessary repairs. In Rotterdam later in the month the vessel was surveyed for the damages including damages due to encountering ice.			
Nov. 24, 1976 Boiler Repairs		?	Sailed from Rouen, and the same day put in Le Havre for boiler repairs. No details of damages or cause of same.			
Dec. 1, 1976 Machinery Damages		In Port	When sailing from Le Havre, alarm indicated a drop in lube pressure and pump found stopped. Vessel proceeded to roads at slow speed. Inspection found white metal scattered inside crankcase. Apparently main damage bottom end bearings and crankpins. Towed to Antwerp for repairs which completed in 32 days.			
March 1978 Aux. Boiler Damages		?	Both heating coils of bunker tank damaged and subsequently auxiliary boiler contaminated by oil deposits leading to damage of furnace crown. Furnace crown to be cropped and partly replaced at sea by boilermaker team.			
Jan. 31, 1979 Stranding due to Power Failure		?	Sustained power/steering failure and then grounded near Skein, Norway, just off Trosvika. Holed in bow but no damage to gas tanks and no leakage of propane. Vessel refloated without assistance and was towed to Rafnes, Norway.			

(Casualties cont'd on next page)

REPORTED CASUALTIES TO LIQUEFIED GAS CARRIERS ABOVE 5000 CBM

VESSEL NAME		CUBIC METERS	FLAG	OWNERS	YEAR BUILT	TANK TYPE: TEMP. C
INGE MAERSK		12,060	Danish	A.P. Moller	1972	S-48
Nov. 22, 1974 Stranded in River	In Port	Inwards from Japan grounded in River Scheldt off Baudouin Locks and was refloated 4 hours later without assistance. Vessel left Antwerp 11 days later. No damages reported, if any.				
April 4, 1978 Cargo Machinery Failure	In Port	While approaching berth at Westernport, Australia, sustained cargo machinery failure. Remained at anchorage for 3 days prior discharging undergoing repairs.				
ISABELLA		35,500	Liberian	Middleburgh Shipping Co.	1975	I-160
Sept. 1, 1979 Engine Room explosion	At Sea	An explosion damaged the engine room while 480 miles southwest of the Azores, enroute from Houston, Texas. One man was seriously injured. Vessel put in to St. Michael's, Azores, and departed next day for Gibraltar.				
ISFONN		18,790	Liberian	Isfonn Inc.	1967	R-50
July 3, 1970 Machinery Damage	At Sea	Enroute Rio Janeiro for Persian Gulf reported cylinder damage which was surveryed at Cape Town. A knock was traced to No. 2 unit of the main engine where water was found leaking from the piston head. The piston, skirt rings and liner were renewed. Excessive scale was found in the piston head and caused overheating and resulted in the piston head fractures. Vessel left Cape Town next day.				

(Casualties cont'd on next page)

REPORTED CASUALTIES TO LIQUEFIED GAS CARRIERS ABOVE 5000 CBM

VESSEL NAME	CUBIC METERS	FLAG	OWNERS	YEAR BUILT	TANK TYPE: TEMP. C
JOSEPH P. GRACE	12,975	Liberian	Oswego Chemical Carriers	1964	R-46
March 6, 1966 In Port Crew Negligence Damaged Condensers	Due alleged crew negligence in failing to maintain cooling water on refrigerator condensers, tubes found badly pitted and corroded, which will require retubing of both condensers. Repairs made in New York in June.				
Feb. 14-19, 1967 At Sea Weather Damages	On passage from Fredericia, Denmark to East Coast of United States encountered heavy weather. Two keel plates part renew, two bottom plates renew and two bottom plates part renew, straighten internals, ten cracks in void tanks to repair, cargo tank insulation part renew, etc.				
July 14, 1967 In Port Hit Dock	Hit dock at Thames Haven, England. Two side plates renew, internals straighten and sundry other damages and removals. Drydocking not required.				
June 1, 1968 At Sea Machinery Damage	While outwards from Tampa to Trinidad No. 2 main engine unit piston skirt and guide ring damaged and required renewal. Repairs apparently made at New York in July.				
Sept. 10, 1968 In Port Boiler Trouble	Vessel at Port of Spain for 2 days carrying out boiler repairs. In December the exhaust gas heated boiler was renewed at Aalborg, Denmark.				
May 9, 1970 In Port Grounding in River	Grounding in Cape Fear River, North Carolina. Keel set up slightly in way of lube oil tank. Repairs deferred until drydocked at Frederikshavn, in June 1971.				
May 28, 1971 In Port Hit Dock	Struck dock when entering at Frederikshavn. Heavy indentation in starboard bow. Strake to crop and part renew special steel and fuel oil tank in way to empty and make gas free.				
May 28, 1971 In Port Fire in Cabin	Fire in crew member's cabin. Cabin burnt out. Inventory and sheathing to renew. Floor in cabin and alley way water damaged. Repairs made while at Frederikshavn.				

(Casualties cont'd on next page)

REPORTED CASUALTIES TO LIQUEFIED GAS CARRIERS ABOVE 5000 CBM

VESSEL NAME	CUBIC METERS	FLAG	OWNERS	YEAR BUILT	TANK TYPE: TEMP. C
JOSEPH P. GRACE cont'd					
June 8, 1971 In Port Pump Room Flooded					Pump room flooded by fuel oil which claimed due to crew negligence. Measures taken to empty pump room into coastwise tanker. Incident occurred at Aalborg, Denmark.
Aug. 23, 1974 In Port Fire					While at Leghorn, Italy, with 7,746 tons of butane gas, took fire while in roadstead awaiting berth. Port fire brigade, harbor master, motor launches and tugs attended and fire was extinquished in about 4 hours. Cause of fire unknown and damages were being examined but not detailed.
Nov. 18, 1975 At Sea Machinery Damage					On voyage from Sluiskil, Belgium, to Donaldsonville, LA, put in Brest, France, for overnight with engine trouble. No details of problem.
March 27, 1977 At Sea Scavenge Fire					On voyage from Wilmington, North Carolina to London, put in St. Michael's, Azores, with main engine trouble due to scavenge fire in No. 4 cylinder. Liner fractured in two in way fuel oil port, piston badly scored, etc. Left Azores 8 days later for Lisbon for further repairs of 16 days.
Oct. 23, 1977 At Sea Machinery Damage					Main engine No. 3 cylinder liner fractured and piston skirt scuffed and cracked due to overheating of piston due cooling water failure. Repairs made in November in Venice.
March 17, 1978 At Sea Engine Damage					Sailed March 7, from Santos, Brazil for Trinidad. Reported due Trinidad with engine damage discovered at sea. Vessel arrived on March 17; no other details provided.

(Casualties cont'd on next page)

REPORTED CASUALTIES TO LIQUEFIED GAS CARRIERS ABOVE 5000 CBM

VESSEL NAME		CUBIC METERS	FLAG	OWNERS	YEAR BUILT	TANK TYPE: TEMP. C
JOULE		11,200	British	Ocean Gas Transport	1965	R-51
Dec.29, 1973-Jan.9, 1974 Heavy Weather Damages	At Sea	Encountered heavy weather and damaged upper and lower shell stringers in P. & S. Nos.1, 2 and 3 ballast tanks which fractured and adrift from frames and plating. Shell webs in way of above tanks fractured, frames sheared, bulkhead stiffners sheared, division bulkheads fractured, insulation damaged by water and part loose, bulwark plating locally distorted and 120 main engine holding down bolts affected. Repairs made at Rotterdam in April.				
Nov. 1, 1976 Boiler Damages	At Sea	Alleged collapse of cargo heating boiler. Furnace wall reported bulged and fitted with welded inserts, 42 tubes distorted and renewed. Tube plates distorted, but repairs of plates deferred. Other repairs made at Genoa in February.				
Feb. 20, 1981 Alternator Damage	At Sea	Enroute to Huelva, reported alternator damage. Due Huelva February 20, 1981. Surveyor attended February 21, 1981. Delivered damaged alternator to Rotterdam for repair. Alternator located at centre position found rotor having been in contact with stator bottom part forward, adjacent to engine flywheel side.				
April 7, 1981 Switchboard Damage	At Sea	Reported main switchboard damage in Jacksonville area on April 7, 1981. Survey requested. Sailed Jacksonville April 16, 1981 to Flotta, Scotland.				
Nov. 6, 1981 Stranded in Channel	At Sea	While carrying a butane/propane cargo, reported stranded in Maracaibo channel on November 6, 1981.				

(Casualties cont'd on next page)

REPORTED CASUALTIES TO LIQUEFIED GAS CARRIERS ABOVE 5000 CBM

VESSEL NAME		CUBIC METERS	FLAG	OWNERS	YEAR BUILT	TANK TYPE: TEMP. C
JULES VERNE		25,500	French	Gaz Marine	1965	I-162
Nov. 26, 1967 Machinery Damage	At Sea	Left Le Havre for Arzew, Algeria but returned 2 days later with engine damage. Remained overnight and then departed again for Arzew.				
Feb. 16, 1972 Machinery Damage	At Sea	Sustained turbine damage off Cherbourg, France, shortly after leaving Le Havre and had to put back to Le Havre for repairs. Remained in port for 11 days and then set sail for Arzew.				
Dec. 1974 Leaking Cargo Tanks	?	At Le Havre for three and one half months for repairs to tanks which were leaking. No information on cause or extent of damages to cargo tanks.				
Dec. 28, 1974 Machinery Damage	At Sea	Some hours after sailing for Arzew, after 3-1/2 months repairing at Le Havre (see above) engine breakdown occurred and vessel put back to Le Havre for overnight repairs. No details of trouble.				
KHANNUR		126,360	Liberian	Gotaas-Larsen	1977	I-162
Aug. 14, 1978 Collision	At Sea	Reported to have been in collision with motor vessel HONG HWA in the Strait of Singapore. Other vessel reported at Singapore discharging cargo and effecting repairs. No damages, if any, reported for KHANNUR.				
LAKE CHARLES		126,530	American	Lachmar	1980	I-165
April 14, 1981 Stranded	At Sea	Reported stranded in New York area on April 14, 1981. Repaired at Quincy, Mass. Renewal of one bilge strake plate with associated internals starboard side.				

(Casualties cont'd on next page)

REPORTED CASUALTIES TO LIQUEFIED GAS CARRIERS ABOVE 5000 CBM

VESSEL NAME		CUBIC METERS	FLAG	OWNERS	YEAR BUILT	TANK TYPE: TEMP. C
LARBI BEN M'HIDI		129,500	Algerian	Algerienne, Cie Nationale	1977	I-160
June 19, 1981 Collision	At Sea	In collision with S tank "IONIAN COMMANDER" off Arzew on June 19, 1981.				
LAVOISIER LPG/Solvents		5,230	Argentinian	Navigas S.A.C.I.M.	1962	P-5
Mar. 23, 1967 Butane Leak	In Port	As LAVOISIER, French Flag, while discharging at Bordeaux, France, butane gas oozed out while being discharged into a dockside storage tank. Officials said a fracture in a safety valve may have caused the leak. Firemen dispersed hundreds of tons of butane gas which leaked into the harbor. Authorities, fearing an explosion, clapped down strict security precautions as firemen attempted to stop the huge white gas cloud drifting over the city. Vessel had loaded 3,000 tons of butane at Argentina.				
June 9, 1975 Contact Damage	In Port	As LAVOISIER, Argentine flag, while lightening liquefied gas carrier GAZANA at Buenos Aires, reported contact with other vessel. Both gas carriers reported sustaining some damage but no details provided.				
LINCOLNSHIRE		31,290	British	Bibby Freighters Ltd.	1972	R-50
June __, 1972 Deck Line Distorted	?	At Cape Town repaired cargo liquid line on deck, of which bellows-type expansion pieces distorted, misaligning the main pipeline itself and the T-piece connection to No. 3 tank hatch and also a second bellows joint in main liquid line to No. 2 buckled, with pipeline set down slightly. Vessel left Cape Town 5 days after arrival.				

(Casualties cont'd on next page)

REPORTED CASUALTIES TO LIQUEFIED GAS CARRIERS ABOVE 5000 CBM

VESSEL NAME	CUBIC METERS	FLAG	OWNERS	YEAR BUILT	TANK TYPE: TEMP. C
LINCOLNSHIRE cont'd					
Oct. 10, 1975 Insulation Impaired Due Leaks	?		Leakage from No. 2 double bottom ballast tank seriously impaired effectiveness tank top insulation in containment space. Cut shell plating and removed about 7,000 cubic feet of insulation. Cause of leakage not stated. Work was performed at Malta.		
Feb. 24, 1976 Insulation Impaired Due Leaks	At Sea		Found, on ballast passage from Houston to Maracaibo, leakage of water into No. 3 hole containment space and also into No. 2 spaces. Insulation in both cases destroyed and required renewal over about 2,155 square meters. Repairs were carried out at Durban in April 1977.		
June 13, 1977 Contact while Lightening	At Sea		While lightening LNG CHALLENGER 40 miles off Bahrain contacted the vessel which was at anchor, while manoeuvering to come alongside. Other gas carrier was damaged affecting about 2 tons of steel weight. Apparently no damage to LINCOLNSHIRE.		
Nov. 7, 1977 Cargo Compressor Damage	At Sea		Vessel put in Wellington, N.A. due damage to port, centre and starboard Freon cargo compressors running gear and to the lubricating and Freon systems by contamination. At Wellington spares and two staff members from local repairs firm embarked to assist with repairs on passage to Westernport, Australia.		
April 18, 1978 Generator Damage	At Sea		Enroute Coatzacoalcos, Mexico, for Mersin, Turkey, anchored off Malta for survey of generator damage. While ship's staff were assembling and positioning rotor in stator, rotor hit and damaged bottom outside coils of stator. Approximately 8 coils were distorted and flattened and wedges broken.		

(Casualties cont'd on next page)

REPORTED CASUALTIES TO LIQUEFIED GAS CARRIERS ABOVE 5000 CBM

VESSEL NAME	CUBIC METERS	FLAG	OWNERS	YEAR BUILT	TANK TYPE: TEMP. C

LINCOLNSHIRE cont'd

May 8, 1978 Cargo Pumps Failed	In Port	At Cartagena, Spain, reported cargo pumps of Nos. 1 and 3 tanks defective condition. Apparently vessel transhipped cargo of anhydrous ammonia from Nos. 1 and 3 tanks to No. 2 tank, from where cargo was discharged. Repairs to cargo pumps to be carried out enroute to Dubai.
Aug./Sept. 1978 Insulation Damage	?	Alleged due water and moisture penetration, time and place not defined but probably during months shown, Nos. 1 and 2 tank bottom glass-fibre insulation variously watersoaked and/or affected by moisture and part torn and vapour seal barrier sheathing torn in places and boding strips mostly detached. About 5-10% insulation each tank bottom to renew each tank about 1,000 sq. m. and vapour barrier to renew each tank. No. 3 tank bottom insulation variously torn, sagged, water-soaked or moisture affected also. All bottom insulation previously renewed Cape Town May 1976.
Aug. 29, 1978 Ballast-Water Contamination	At Sea	En route Santos, Brazil, for Trinidad, due perforation in ballast line, fuel oil from forward deep tank contaminated ballast water in forepeak tank. Ballast line holed and forepeak tank heavily contaminated with fuel oil.
Sept. 6, 1979 Contact Damage Lightening	In Port	At Zone A, River Plate Estuary, Argentina, while approaching LPG tanker ATLANTE for lightening cargo, contacted other vessel. Both vessels sustained damages. No other details.
Dec. 2-3, 1979 Cargo Manifold Fractured	In Port	While discharging cargo mixture of propane and butane at Houston, Texas an automatic valve of the shore installation was shut by mistake, resulting in a build-up of pressure in the discharge lines, fracturing No. 3 cargo tank manifold and emergency pump discharge pipe of No. 1 cargo tank manifold. Next day, the cargo chicksan of the shore installation fractured and fell on top of the guard rails on main deck. Owner alleged damage due to same casualty.

(Casualties cont'd on next page)

REPORTED CASUALTIES TO LIQUEFIED GAS CARRIERS ABOVE 5000 CBM

VESSEL NAME		CUBIC METERS	FLAG	OWNERS	YEAR BUILT	TANK TYPE: TEMP. C
LNG AQUARIUS		126,300	American	Wilmington Trust Co.	1977	I-165
June 20, 1981 Deck Cracks	At Sea	Enroute Bontang to Nagoya sustained heavy weather damage off Nagoya June 19-20, 1981. Survey requested. Arrived Nagoya June 22, 1981. Reported deck cracks around No. 5 dome.				
LNG CAPRICORN		126,300	American	Wilmington Trust Co.	1978	I-165
April 1979 Cargo Compressor Explosion	?	Survey requested in respect of cargo compressor explosion on arrival at Nagoya, Japan. No other details.				
Sept. 7, 1979 Tug Contact	In Port	Tug contact, apparently at Arun, damaged bulbous bow. Survey conducted at Himeji, Japan. No other details.				
Jan. 26, 1981 Machinery Damage	At Sea	Enroute Arun to Tobata, reported No. 2 turbo generator damage off Tobata on January 26, 1981. Surveyed at Tobata January 30, 1981. Sailed for Singapore after loading replacement auxiliary steam turbine rotor and with repair squad on board. Sustained vibration and journal bearing damages. Damaged rotor removed ashore at Singapore for repair. Fore and aft bearings to be renewed and diaphragms, nozzle block and labyrinth packings to be cleaned.				
Oct. 24, 1981 Explosion	In Port	Explosion in air intake duct of port main boiler at Arun terminal on October 24, 1981. Repairs deferred. Air intake casing to crop and part renew and expansion bellows to renew.				

(Casualties cont'd on next page)

REPORTED CASUALTIES TO LIQUEFIED GAS CARRIERS ABOVE 5000 CBM

VESSEL NAME		CUBIC METERS	FLAG	OWNERS	YEAR BUILT	TANK TYPE: TEMP. C
LNG GEMINI		126,300	American	Patriot I Shipping Corp.	1978	I-165
Jan. 1969 Contamination of Tanks, Pumps, Lines, etc.	In Port	Vessel docking at shipyard at Singapore reported contamination of cargo tanks, pipelines, pumps, etc. at last loading port. No other details.				
May 22, 1981 Main & Auxiliary Turbines Damage	At Sea	Reported damage to main and auxiliary turbines in Nagasaki area on May 22, 1981. Survey requested at Nagasaki on May 25, 1981. Sailed June 23, 1981 for Bontang.				
July 3, 1981 Machinery Damage	In Port	Stator windings of one cargo pump motor burnt out while discharging LNG at Bontang on July 3, 1981. Motor from No. 5 tank changed at Singapore and stator rewound.				
LNG LEO		126,400	American	Patriot II Shipping Corp.	1978	I-165
July 1980 Hit Dock	In Port	While discharging LNG cargo in strong winds at Kobe, damaged pier facilities due to parting of mooring rope. Owners allege shore gangway was broken, two liquid and one vapor return chicksan arms extended from normal positions, and pier fenders damaged. No damage reported to vessel.				
Jan. 14, 1981 Stranded	In Port	Reported touched bottom at Tobata on January 14, 1981. Rusted/scored bottom plating to clean, sandblast, and paint.				
Aug. 20, 1981 Misalignment Low Pressure Turbine	At Sea	Reported misalignment of main low pressure turbine in Sakaide area on August 20, 1981. Turbine casing to adjust by new chocks.				

(Casualties cont'd on next page)

REPORTED CASUALTIES TO LIQUEFIED GAS CARRIERS ABOVE 5000 CBM

VESSEL NAME		CUBIC METERS	FLAG	OWNERS	YEAR BUILT	TANK TYPE: TEMP. C
LNG LEO cont'd						
Aug. 25, 1981 Rudder Bearing Damage	At Sea	Reported rudder bearing damage in Sakaide area on August 25, 1981.				
Sept. 2, 1981 Tailshaft Damage	At Sea	Reported tailshaft damage in Sakaide area on September 2, 1981. New tailshaft to supply and fit, 1 intermediate shaft to take ashore, coupling bolt holes to machine and stern tube oil gland components to repair.				
LNG LIBRA		126,400	American	Hull Fifty Corp.	1979	I-165
July 1980 Pump Room Flooded	?	Water damage in forward pump room. Cause and date unknown.				
Oct. 1980 Propeller Damage	At Sea	Propeller shaft moved aft against rudder during loaded voyage from Bontang to Japan. Vessel in tow off Philippines, and arrived Malalag Bay on October 7. LNG was transferred to sister ship LNG LEO over a 32 hour period (October 10-12) using two lines. Vessel sailed October 13 in tow, and arrived Singapore on October 26 where survey revealed fracture of tailshaft.				
LNG TAURUS		126,300	American	U.S. Trust Co. of N.Y.	1979	I-165
Dec. 1980 Stranded Laden off Japan	At Sea	Vessel grounded in rough seas off Kitakyushu City on December 12 while en route from Bontang carrying LNG cargo. Refloated four days later by motor tug ZWARTE ZEE and seven harbor tugs. Extensive damage incurred to Nos. 3, 4, 5 and 9 ballast tanks. Vessel arrived in tow at Tobata December 17 to discharge cargo and left same day for drydocking at Nagasaki. Vessel returned to service April 18.				

(Casualties cont'd on next page)

REPORTED CASUALTIES TO LIQUEFIED GAS CARRIERS ABOVE 5000 CBM

VESSEL NAME	CUBIC METERS	FLAG	OWNERS	YEAR BUILT	TANK TYPE: TEMP. C
LNG VIRGO	126,400	American	Patriot IV Shipping Corp.	1979	I-165
April 6, 1981 At Sea Boiler Damage	Reported boiler damage during voyage to Singapore on April 6, 1981. Survey requested.				
LORD KELVIN	31,100	British	Ocean Gas Transport Ltd.	1978	R-48
Oct. 29, 1978. In Port	While anchored in Great Bitter Lake, Suez Canal, with pilot aboard, was struck by another vessel that dragged her anchors. Accommodation ladder and davit arm extensively damaged and slight indent in hull.				
LUIGI CASALE	14,268	Italian	"CARBOCOKE" Societa di Navigazione S.p.A.	1967	R-48
June 2, 1967 In Port Hit Jetty	As CAPELLA, Swedish Flag, struck jetty while berthing in Port Hedland, Australia. No damage to ship but minor damage to jetty.				
M.P. GRACE	19,314	Liberian	Oswego Chemical Carriers	1967	R-54
Sept. 1968 At Sea Heavy Weather Damages	At Chaguaramas, Trinidad owners reported vessel had heavy weather damages. No details of damages provided.				

(Casualties cont'd on next page)

REPORTED CASUALTIES TO LIQUEFIED GAS CARRIERS ABOVE 5000 CBM

VESSEL NAME	CUBIC METERS	FLAG	OWNERS	YEAR BUILT	TANK TYPE: TEMP. C
M.P. GRACE cont'd					
Feb. 26, 1969		?	Vessel was drydocked at Frederikshavn, Denmark, after grounding at unstated location. Vessel's bottom severely indented between bilge keels both sides at various plates from fore to aft with damage below rudder bottom bearing and set plates renewed.		
Dec. 1972/ Jan. 1973 Weather Damages		At Sea	Bottom plating in way of forepeak and No. 1 double bottom tanks port and starboard buckled due to encountering heavy weather.		
Jan. 20, 1973 Crane Damage		In Port	Engine-room crane hoisting gear smashed beyond repair while at Ponta Delgada, Azores.		
July 14, 1975 Collision		At Sea	Was in collision with small cargo ship lat. 58 42N, long. 03 03W north-east of Stroma Island. Some damage to side of gas carrier but proceeded on voyage to United States. Cargo ship went astern and proceeded. Damage to her bow but she did not require assistance.		
Aug. 4, 1978		?	Put in Durban, S. Africa, enroute Maputo for Persian Gulf for repairs of boiler tube damage. Composite auxiliary boiler lost water and overheated oil-fired tubes, resulting in heavy water leakage. Attempted temporary repairs at anchor by crew unsuccessful. Permanent repairs effected in that 2,000 oil-fired tubes renewed at Durban.		

(Casualties cont'd on next page)

REPORTED CASUALTIES TO LIQUEFIED GAS CARRIERS ABOVE 5000 CBM

VESSEL NAME	CUBIC METERS	FLAG	OWNERS	YEAR BUILT	TANK TYPE: TEMP. C
MARINE EAGLE	11,010	American	Marine Transport Lines Inc.	1944 Converted: 1969	R

April 30, 1969 Line in Propeller	In Port	Mooring line fouled the propeller while docking at DuPont Terminal, Gibbstown, New Jersey, on voyage from Beaumont, Texas. In July at New York the spare propeller was installed and the fairwater cone renewed and one 7 inch Dacron mooring line renewed.
July 3, 1969 Steering Gear Damage	In Port	While testing the steering gear prior to departure from Newport News, Virginia, damage was sustained due to crew negligence. It was necessary to renew two auxiliary hydraulic cylinders, rams, tie rod and steering tiller shoe, etc.
March 10, 1970 Hit Dock	In Port	Struck the dock at Carteret, New Jersey while docking and sustained damages to shell. Two shell plates were part renewed and affected internals repaired.
Aug. 2º, 1973 Generator Damage	In Port	While departing from Beaumont enroute at Gibbstown, New Jersey, main generator damaged due tube failure in the air-cooler system. Repairs were completed at Galveston in September.
April 4, 1977 Stranded in River	In Port	Ran aground 30 miles south of Philadelphia in Delaware River, bound for Gibbsboro. Refloated 8 hours later. No report of damages, if any. Sailed later the same day for Bayonne.

(Casualties cont'd on next page)

REPORTED CASUALTIES TO LIQUEFIED GAS CARRIERS ABOVE 5000 CBM

VESSEL NAME		CUBIC METERS	FLAG	OWNERS	YEAR BUILT	TANK TYPE: TEMP. C
METHANE PRINCESS		27,400	British	British Gas Corp.	1964	I-162
Aug. 20, 1966 Fire in Repair Yard	In Port	While lying at Tilbury Repair Jetty, London, small fire started on bottom floor by after cofferdam in ballast tank. Solvent on fire, probably caused by welders' torches. Fire extinguished by ship's staff in 1/2 hour. No damage sustained by the vessel, but welding and electric cables used by repairers damaged.				
Feb. 10, 1967 Collision in River	In Port	Was in collision with hopper barge near Sea Reach No. 4 Buoy, Thames Estuary and then aground. Hole in forepeak above water. Vessel was on voyage from Canvey Island, U.K. to North Africa, in ballast. Refloated about 2 hours later and proceeded to anchorage, and then to repair berth at Tilbury Repair Jetty. Next day the gas carrier sailed for Arzew, Algeria.				
METHANE PROGRESS		27,400	British	British Gas Corp.	1964	I-162
Feb. 11, 1970 Stranding in River	In Port	Stranded in Thames River inbound from Arzew, Algeria. Vessel refloated about 2 hours later without assistance. Believed no damage incurred. Vessel discharged and sailed two days later for Arzew.				
July 19, 1971 Boiler Trouble	At Sea	Returned to London, Tilbury Repair Jetty, after departing two days earlier for Arzew, with boiler trouble. One week later sailed again for Arzew.				
Oct. 9, 1973 Hit Dock	In Port	While entering the lock at Tilbury, London, as a "dead ship" and being towed by tugs, hit against the lower pierhead causing damage to the pierhead and the vessel's bow. Repairs to be completed in drydock.				

(Casualties cont'd on next page)

REPORTED CASUALTIES TO LIQUEFIED GAS CARRIERS ABOVE 5000 CBM

VESSEL NAME		CUBIC METERS	FLAG	OWNERS	YEAR BUILT	TANK TYPE: TEMP. C
METHANE PROGRESS cont'd						
April 19, 1974 Hit Bottom	In Port	Touched bottom at Arzew, Algeria and damaged bottom and rudder. Vessel was towed to Barcelona for gas-freeing and inerting tanks prior proceeding Palermo, Sicily, for repairs. Repairs were completed in 53 days.				
Dec. 6, 1974 Hit While Moored	In Port	While moored at London, hit by motor vessel TOWER PRINCESS which proceeding inward. Gas carrier sustained a three foot hole in the steering flat 10 ft. above the water line. The other vessel sustained buckled bulwarks and mast. Gas carrier sailed 2 days later for Arzew.				
August 1978 Cargo Tank Damage	In Port	No. 3 cargo tank damaged in August 1978 was repaired St. Nazaire, France, in June 1979. Repairs expected to take 20 days being effected by repairers from Hamburg who supplied the aluminium, assisted by the local shipyard.				
July 19, 1979 Fire in Insulation While in Shipyard	In Port	A fire started within insulating material between aft bulkhead of No. 3 hold and cofferdam while under repairs at St. Nazaire, France. No apparent damage inside No. 3 cargo tank. Fire damage repairs completed August 10.				
MONOMER VENTURE		5,748	Panamanian	Mundogas (Storage) Inc. Rebuilt:	1945 1962	R-45
July 26, 1964	?	As ESSO CENTRO AMERICA, Panamanian flag, enroute Puntarenas for Aruba, in ballast, arrived Cristobal, R.P. for minor repairs to No. 5 cylinder. Sailed 6 days for Aruba.				
Feb. 6, 1965	?	As ESSO CENTRO AMERICA, Panamanian flag, enroute Puntarenas for Aruba, in ballast, arrived Cristobal, R.P. and undergoing repairs to auxiliary motor generator. Left for Cartagena, Col. 5 days later.				

(Casualties cont'd on next page)

REPORTED CASUALTIES TO LIQUEFIED GAS CARRIERS ABOVE 5000 CBM

VESSEL NAME	CUBIC METERS	FLAG	OWNERS	YEAR BUILT	TANK TYPE: TEMP. C
MONOMER VENTURE cont'd					
July 21, 1972 Contact Damage	In Port	As MONOMER VENTURE, and apparently used only as a storage vessel, was reported sustaining contact (report calls it collision) damage at Heroya, Norway due to contact with Danish motor vessel WATCHET STAR. Five shell plates were badly set in and holed in two places and internals twisted. Permanent repairs were deferred until vessel resumes trading.			
Jan. 11, 1976 Explosion in Cargo Control Room	?	Apparently after vessel loaded at Maracaibo, an explosion in the cargo pump control room damaged all control gear and the control room and the chief engineer was hurt badly. It may have happened at the dock. Vessel put into Punta Cardon, Venezuela where repairs were completed in 15 days. Permanent repairs were made at Savannah in October.			
MONTERREY	53,400	Mexican	Petroleos Mexicanos	1979	R-48
March 15, 1981 Contact Damage	In Canal	Alleged contact with Miraflores lock wall, Panama Canal, on March 15, 1981. Surveyed at La Seyne on May 15, 1981. Permanent repairs effected. Port side 1st below sheer in way No. 1 high ballast tank set in. Starboard side 1st, 2nd below sheer in way No. 2 high ballast tank set in.			
MOSTEFA BEN BOULAID	125,260	Algerian	Algerienne, Cie. Nationale	1976	I-160
Dec. 1-2, 1976 Broke Moorings in Gale	In Port	During strong gale the gas vessel broke her moorings at Marseilles and struck motor vessels KERGUELEN and SUN AKES. Vessel reported to be at a yard for repairs with empty tanks.			

(Casualties cont'd on next page)

REPORTED CASUALTIES TO LIQUEFIED GAS CARRIERS ABOVE 5000 CBM

VESSEL NAME		CUBIC METERS	FLAG	OWNERS	YEAR BUILT	TANK TYPE: TEMP. C
MOSTEFA BEN BOULAID cont'd						
April 20, 1977 Touched Ground	In Port	While underway to lay-up near Haugesund, Norway, touched ground at Bovagen, but was refloated and berthed by local tugs. Limited bottom damages will probably be repaired when docking in Autumn of 1978.				
April 8, 1979 LNG Spill Fractured Deck	In Port	At Maryland vessel had LNG spill. Deck fractured and possible cargo tank damage. Vessel repaired at La Ciotat, France, for about one month.				
MUNDOGAS AMERICA		52,647	British	Mundogas America	1972	R-48
Mar. 1, 1973 Boiler Damage	At Sea	As GARMULA, British flag, arrived Cape Town with fractured boiler. Apparent cause faulty welding from undercut at top of fillet. Fracture also located in one feed circulating tube in way of lamination at top. Vessel sailed 2 days later.				
May 7, 1973 Machinery Trouble	?	As GARMULA, British flag, enroute La Salina, Venezuela, for Japan with cargo of propane, repaired at Cristobal, R.P., for at least 6 days, turbo-blower trouble.				
Aug. 24, 1973 Steering Gear Trouble	At Sea	As GARMULA, British flag, enroute Ras Tanura for Buenos Aires, put in Montevideo Roads overnight to effect repairs to steering gear. No other details provided.				

(Casualties cont'd on next page)

REPORTED CASUALTIES TO LIQUEFIED GAS CARRIERS ABOVE 5000 CBM

VESSEL NAME	CUBIC METERS	FLAG	OWNERS	YEAR BUILT	TANK TYPE: TEMP. C
MUNDOGAS AMERICA cont'd					
March 9, 1974 Machinery Damage	?		As GARMULA, British flag, an auxiliary engine lubricating oil failure resulted in crankshaft bent and condemned. Two connecting rods scored in crankpin bearing housing. Repairs to be completed at sea upon receipt of a new crankshaft.		
Sept. 27, 1974 Three Killed Due Failure Air-Circulation System	In Port		As GARMULA, British flag, the captain and 2 officers suffocated to death when the air circulating system failed while they were inspecting the bilges, at Santos, Brazil. The accident occurred as 15,000 tons of liquid gas were being discharged. Two Pakistani crew members managed to escape through a narrow bilge duct. The air-circulating system failed while the five men were on a routine inspection.		
June 16, 1976 Grounding	In Port		As GARMULA, British flag, grounded at unstated location and outer stern tube seals leaking and stern tube oil system contaminated with sea water and repaired at Schiedam, Netherlands in October.		
Dec. 29-31, 1976 Weather Damages	At Sea		As GARMULA, British flag, alleged heavy weather resulted in damage to high wing ballast, tank bulkheads, double bottom fuel/ballast tank bulkheads and internals in way claimed severely fractured and ammonia tank insulation variously soaked/water damaged. Eight cargo pumps were later found out of order, and further structural cracking revealed.		
Jan. 10 1977 Weather Damages	In Port		As GARMULA, British flag, in Boston Roads, Mass., heavy weather caused damage to anchor stopper and fractured also, anchor flukes and chain affected. Repairs to be carried out later in the year.		

(Casualties cont'd on next page)

REPORTED CASUALTIES TO LIQUEFIED GAS CARRIERS ABOVE 5000 CBM

VESSEL NAME		CUBIC METERS	FLAG	OWNERS	YEAR BUILT	TANK TYPE: TEMP. C
MUNDOGAS AMERICA cont'd						
May 28, 1979 Lost Port Anchor in Heavy Weather	At Sea	As GARMULA, British flag, enroute Ras Tanura, S.A. to River Plate, Argentina during heavy weather in South Atlantic lost port anchor due breakage of connecting link.				
Feb. 1980 Contact Damage	In Port	As MUNDOGAS AMERICA, survey requested at New York in respect of damage sustained due to contact with tug while docking. Date and place unknown.				
MUNDOGAS EUROPE		22,246	Liberian	Gas Shipping Ltd.	1968	R-48
Jan. 8, 1969 Steering Gear Problem	At Sea	As KRISTIAN BIRKELAND, Norwegian flag, put in Bermuda, enroute U.K. to Beaumont, Texas, with steering gear problem. Departed next day. No details of problem.				
Mar. 14, 1970 Touched Ground	At Sea	As KRISTIAN BIRKELAND, Norwegian flag, while on voyage up fjord to Heroya, Norway, from Lake Charles, Louisiana, touched ground. Vessel left Porsgrunn 3 days later for Sandefjord for docking. No other details provided.				
Sept. 1980 Fire in Engine Room	At Sea	As MUNDOGAS EUROPE, fire in wiping/sludge No. 2 main engine while sailing from Pajaritos to Rio Grande. Repairs effected by local workshop crew, and vessel subsequently arrived at Rio Grande September 19.				
MUNDOGAS PACIFIC		21,795	Liberian	Gas Shipping Ltd.	1969	R-48
Jan. 11, 1978 Cargo Heater Failure	In Port	As FERNWOOD, Norwegian flag, arrived Salvador, Brazil to discharge 1,500 tons of ammonia to storage vessel MUNDOGAS NORTE, anchored off Aratu port. Had cargo heater failure and unable to effect discharge. 540 heater tubes require replacement. Order to proceed to Trinidad for repairs.				

(Casualties cont'd on next page)

VESSEL NAME	CUBIC METERS	FLAG	OWNERS	YEAR BUILT	TANK TYPE: TEMP. C	
MUNDOGAS PACIFIC cont'd						
Dec. 29, 1978 Engine Room Explosion/Fire		At Sea	As FERNWOOD, Norwegian flag, enroute Nikiski for Avonmouth, U.K., via Panama Canal had an engine room explosion. Vessel, fully loaded with ammonia, had a blackout. Subsequently, main engine stopped and vessel towed to Balboa, Panama. Apparently No. 2 auxiliary generator circuit-breaker on main switchboard short-circuited and consequently fire occurred in No. 2 cubicle of switchboard.			
March 6, 1979 Cargo Gas-Freeing Fan Blower Damaged		?	At St. Nazaire, France, survey requested respect cargo blower trouble. Damage on port side cargo gas-freeing fan blower. Complete rotating element, including fan impeller shaft, bearing housings and couplings to be renewed, and shaft seal assembly, etc.			
July 22, 1979 Multiple Diesel Generator Failures		At Sea	Put in Djibouti as port of refuge on August 20, with multiple diesel generator failures. First failure occurred enroute Augusta for Ras Tanura to No. 2 diesel generator. Piston, liner and connecting rod broken, etc. Second failure occurred August 16, and repairs to No. 2 generator had not been completed, therefore, diversion to Djibouti. No. 3 generator crankshaft damaged. Nos. 1, 3, 6, 7 and 8 crankpins heavily scored and Nos. 2, 4, and 5 lightly scored. Permanent repairs in hand by travelling repair party.			
March 1980 Compressor Damage		?	Damage to ammonia compressors nos. 5 and 6 due to seawater contamination. Noted in Montevideo. No further details.			
May 1980 Engine Damage		At Sea	Port and starboard generator breakdown on May 17 followed by engine aft turbo-blower stoppage on May 19 enroute from Quintero to Maracaibo. Vessel diverted to Puerto La Cruz on May 21. Set pistons, connecting rods, liners, cylinder covers and bearings were lost on both generators and rotors, bearing and part housing lost on turbo-blower. Sailed May 22 for Italy.			

(Casualties cont'd on next page)

REPORTED CASUALTIES TO LIQUEFIED GAS CARRIERS ABOVE 5000 CBM

VESSEL NAME	CUBIC METERS	FLAG	OWNERS	YEAR BUILT	TANK TYPE: TEMP. C
MUNDOGAS RIO	19,462	Liberian	Mundogas Rio. Ltd.	1967	R-42
Oct. 24, 1967 At Sea Machinery Overhaul	Enroute Flushing, Netherlands to Puerto La Cruz, Venezuela, put in Horta, Azores, for a few hours for a cylinder overhaul. No other details.				
May, 1973 At Sea Machinery Damages	During the voyage from Buenos Aires to Ras Tanura there were many stops at sea due mainly to piston cooling water jackets leaking. The main engine lubricating oil was found to be contaminated with fresh water. On May 13, the vessel put into Durban, S.A. for repairs and stores. On the return trip from Ras Tanura to Durban there were additional repairs required to the main engine. Also the exhaust gas boiler tubes were found blocked with a hard deposit due to contamination of the feed water due to a leaking fuel oil heater.				
NOPAL TELLUS	18,422	Liberian	Oivind Lorentzen	1968	R-51
June 21, 1974 In Port Hit Buoy	As ROLAND, sustained damage to propeller due to contact with buoy when leaving Quintero Bay, Chile, to ride out stormy weather. No other details.				
Feb. 1980 At Sea Engine Damage	As KATRISA, damage to compressor rings nos. 1 and 6 cylinders on main engine while enroute from Leghorn to Skikda. Vessel continued at reduced speed for Leghorn where partial repairs were carried out. Later returned for final repairs.				
NORMAN LADY	87,600	British	Coroman Co. Ltd.	1973	I-163
Sept. 7, 1973 In Port New Building; Boiler Damage	Two months before delivery in the builder's yard at Stavanger, Norway, there was an explosion in the boiler and damage was sustained. No other details provided.				

(Casualties cont'd on next page)

REPORTED CASUALTIES TO LIQUEFIED GAS CARRIERS ABOVE 5000 CBM

VESSEL NAME	CUBIC METERS	FLAG	OWNERS	YEAR BUILT	TANK TYPE: TEMP. C
NORTHERN ARROW	75,610	Liberian	Northern Arrow Inc.	1978	R-48
May 1980 ? Engine Room Flooded	Water flooding no. 3 void space discovered at Dubai where vessel arrived fully-loaded. This was due to ruptured eductor line. Bulkheads port and starboard were distorted, and deck and deckhead ruptured. No. 2 compressor motor was burnt out. Temporary repairs were effected in Dubai, while permanent repairs were deferred until next drydocking.				
July 6, 1981 At Sea Flooding Damage	Reported flooding damage off Lisbon on July 6, 1981. Survey requested. Arrived Lisbon July 7, 1981.				
NORTHERN EAGLE	75,650	Liberian	Northern Eagle Inc.	1978	R-48
Jan. 1, 1979 ? Generator Damages	Survey requested at Holmerstrand, Norway in respect to damage to Nos. 1 and 3 generators. No other details.				
Jan. 21, 1981 At Sea Collision	Reported in collision with LPG tanker AL BIDA off Kalamata on January 21, 1981, during transfer operations. Survey requested.				

(Casualties cont'd on next page)

REPORTED CASUALTIES TO LIQUEFIED GAS CARRIERS ABOVE 5000 CBM

VESSEL NAME	CUBIC METERS	FLAG	OWNERS	YEAR BUILT	TANK TYPE: TEMP. C
NYHAVN	19,450	Norwegian	Chr. Haaland	1968	R-47
Nov. 19, 1975 At Sea Holes & Hull Cracks	After crossing the Gulf of Alaska sustained damage and put in Homer, Alaska. Several small holes and crack in double bottom fuel tank on port side and cracks in sea chest. Vessel returning to Victoria, B.C., for repairs. The vessel was on a voyage from Guaymas, Mexico to Nikiski, Alaska. Five days were spent at Victoria and sailed for USA.				
OCEAN FROST	11,400	Liberian	Armagas Ltd.	1966	R-51
Sept. 12, 1968 At Sea Collison	As HAVFROST, Norwegian flag, collided with German motor vessel UHENFELS off Bat, near Flushing, Belgium. Both vessels seriously damaged at bow above waterline. Both vessels put into Antwerp. HAVFROST left Antwerp 29 days later. No report of damage in detail.				
Sept. 29, 1976 ? Machinery Damages	As HAVFROST, Norwegian flag, arrived Bajo Grande, Venezuela in ballast and requested a surveyor in respect engine exhaust channels, cargo pumps and air coolers. No other details provided. Vessel left 7 days later for Minatitlan, Mexico.				
OGDEN BRIDGESTONE	74,580	Panamanian	Ogden Orinoco Transport Inc.	1973	R-46
Dec. 7, 1976 At Sea Machinery Damage	Enroute Bandar Mahshahr, Iran, for Japan with cargo, sustained machinery damage. Put into Singapore overnight for repairs and then continued voyage to Japan. No details of damages.				

(Casualties cont'd on next page)

REPORTED CASUALTIES TO LIQUEFIED GAS CARRIERS ABOVE 5000 CBM

VESSEL NAME	CUBIC METERS	FLAG	OWNERS	YEAR BUILT	TANK TYPE: TEMP. C
OGDEN BRIDGESTONE cont'd					
Sept. 20, 1977 At Sea Machinery Damage	Enroute Bandar Mahshahr, Iran, for Japan reported main engine damage after leaving loading port. Apparently, put into Mena al Ahmadi overnight for repairs. No details provided.				
Sept. 1979 ? Stern Gland Leakage	While drydocking at Sakaide, Japan, surveyed stern gland leakage. No other details.				
July 1980 ? Engine Damage	Main engine turning gear damaged. Cause and date unknown. Surveyed at Kobe on July 24.				
May 27, 1981 At Sea Engine Damage	Sustained main engine damage during voyage from Yokohama to Westernport on May 27, 1981. Three sets of gearwheels to remove to workshop and check for truth and damage to white metal of No. 3 idle gear to renew.				
PASCAL		15,022	French	Cie. Generale Maritime	1976 S-48
Nov. 3, 1978 In Port Collision	Collision in Houston, Texas with motor vessel JELA TOPIC. Both vessels grounded following collision. PASCAL was refloated with tug assistance. Port side shell plating, deck plating, bulwarks and internal members in way of No. 3 port void compartment and machinery spaces damaged. No leakage as a result of grounding. Understood vessel sailed same day for U.K.				

(Casualties cont'd on next page)

REPORTED CASUALTIES TO LIQUEFIED GAS CARRIERS ABOVE 5000 CBM

VESSEL NAME		CUBIC METERS	FLAG	OWNERS	YEAR BUILT	TANK TYPE: TEMP. C
PERMIAN GAS		10,810	Liberian	Global Gas Transport Inc.	1968	S-48
June 26, 1970 Contact, No Damage	In Port	As CAP D'ANTIBES, French flag, contact with motor vessel AEOLOS, at Convent, Louisiana. Assume the gas carrier anchored or moored at time of contact, but report not clear on this point. Some damage to Shell on AEOLOS but no mention of any damage to CAP D'ANTIBES.				
March 18, 1975 Grounding	In Port	As CAP D'ANTIBES, French flag, loaded with gas, grounded at Zueitina, Libya in lat. 30 54N, long. 20 05E. Understand trying to transfer cargo to another vessel. Refloated and sailed for Piraeus 13 days later. No report of damage.				
PETRON GASUL		28,875	Philippine	Phil. Nat. Oil. Co.	1962	R-41
Jan. 6, 1972 Shaft Damage	?	As BRIDGESTONE MULTINA, Liberian flag, agents requested survey of stern shaft damage at Singapore. Vessel spent 2 days at Singapore and left for Japan. No other details provided.				
June 30, 1977 Hit Dock	In Port	As BRIDGESTONE MULTINA, Liberian flag, while attempting to berth at Melbourne, Australia, vessel struck jetty due to excessive strong winds. Damage indentation shell plating and hole in bow area. Damage also sustained by wharf and deck structure of attending tug Henry Bolte. Left for Japan 12 days later. No other details.				
PIONEER LOUISE		77,500	Liberian	Regent Shipping Co.	1976	R-45
Jan. 21, 1977 Propeller Damage	At Sea	Enroute Bandar Mahshahr, Iran, for Chiba and Wakayama, Japan, damaged propeller and drifted off Hamamatsu. Three days later arrived in tow at Wakayama and sailed the next day in tow for Yokohama for repairs. Sailed from repair yard 10 days later for Persian Gulf. No indication of type of damage to propeller or cause.				

(Casualties cont'd on next page)

REPORTED CASUALTIES TO LIQUEFIED GAS CARRIERS ABOVE 5000 CBM

VESSEL NAME		CUBIC METERS	FLAG	OWNERS	YEAR BUILT	TANK TYPE: TEMP. C
POLAR ALASKA		71,500	Liberian	Polar L.N.G. Shipping Corp.	1969	I-162
Nov. 19, 1969 Gas Leakage; Invar Strakes Creased	In Port	Gas leakage at time of loading in Alaska, No. 1 cargo tank barrier detected. Various damage to mineral insulated cables to pump motors, nitrogen bubbler tubes, barrier punch nitrogen feed line, etc. No. 1 cargo tank primary barrier invar strakes creased at numerous locations. Cause of casualties not stated, if known.				
May 6, 1970 Propeller, Shaft Damage	?	Examination in drydock at Yokohoma revealed damage to propeller, tailshaft, rope-guard and stern tube oil seal, cause unknown.				
Feb. 24, 1973 Cracks in Deck Plates	?	At Kobe, Japan, found fractures in upper deck plating about 5 or 6 in way of No. 1 tank, varying in length between 3 meters and 800 mm. also in way of No. 3 tank access thatch approximately 14 or 15 fractures of 800-900 mm. in length. Void space internals of No. 4 tank also found fractured. It appears heating lines for spaces affected were omitted during construction and this was with ambient temperature in Alaska of minus 40 deg. Centigrade may have contributed to casualty.				
Dec. 20, 1976 Tank Leakage	?	While loading at Kenai, Alaska found leakage No. 5 tank, cause unknown. Liquid leakage to primary barrier and vapour leakage to secondary barrier. US Coast Guard permitted vessel to sail for Yokohoma with No. 5 tank, primary and secondary barriers inerted with CO2, and tanks No. 1 to No. 4 and 6 loaded.				
Aug. 20, 1978 Hit Dock	In Port	Made hard contact with Phillips loading pier at Kenai, Alaska. Damages under investigation. Vessel redocked next day. No further data provided.				

(Casualties cont'd on next page)

REPORTED CASUALTIES TO LIQUEFIED GAS CARRIERS ABOVE 5000 CBM

VESSEL NAME		CUBIC METERS	FLAG	OWNERS	YEAR BUILT	TANK TYPE: TEMP. C
POLLENGER		87,600	British	LNG Carriers Ltd.	1974	I-163
June 7, 1977 Contact Damage	At Sea	As LNG CHALLENGER, British flag, while in laden condition, lying at anchor about 40 miles off Bahrain, was contacted by LINCOLNSHIRE which manoeuvering alongside to load cargo from the LNG CHALLENGER. Shell plating indented and holed in two locations in way of engine room stores. Frames slightly distorted. Vessel was carrying LPG at time of casualty.				
Aug. 26, 1978 Contacted by Floating Crane	?	As LNG CHALLENGER, British flag, contacted by floating crane MAGNUS IX, while apparently at anchor off Bahrain. Sustained two holes and big dent on port side. Port anchor flukes driven into shell. Hull indents in fuel oil tank.				
April 25, 1979 Cargo Drip Fractured Steel Tank Cover	In Port	While discharging LNG at Boston, Mass., cargo dripped onto cover from leaking gland of eductor drive valve on top of No. 1 dome causing fracture in No. 1 steel plate tank cover between cover girders. On May 8 put into Gibraltar to temporarily repair damage including fitting a doubling plate 6.5' by 10.5' over affected areas.				
Nov. 11, 1979 Lost Anchor & Chain	In Port	When anchoring at Gibraltar, lost starboard anchor and 13 lengths of chain. Anchor recovered several days later and returned to vessel on subsequent call November 20.				
PUERTO RICAN (LPG/Chemical)		12,320	American	Bankers Trust Co.	1971	R-14
May 13, 1976 Tug Contact	In Port	While docking with tug assistance at New Orleans, LA, the tug collided with the gas carrier, which sustained a hole in the starboard bow. Repairs included part renewal of two side shell plates and fairing of three plates. Repairs were deferred.				

(Casualties cont'd on next page)

REPORTED CASUALTIES TO LIQUEFIED GAS CARRIERS ABOVE 5000 CBM

VESSEL NAME		CUBIC METERS	FLAG	OWNERS	YEAR BUILT	TANK TYPE: TEMP. C
PUERTO RICAN cont'd						
April 21, 1981 Contact Submerged Object	At Sea	Reported struck submerged object during voyage from Wilmington, NC., to Marcus Hook, NC., on April 21, 1981 with a part cargo of LPG. Surveyed in drydock at Chester, PA. Repairs effected. Removal of propeller, tailshaft draw, inspect and replace.				
PYTHAGORE		14,258	Panamanian	Antarctic Gas Inc.	1967	R-48
March 17-19, 1971 Weather Damages	At Sea	As ARQUIMEDES, Panamanian flag, encountered heavy weather on voyage from Rotterdam to Buenos Aires, loaded with butane gas. Deck ventilators leading to forward storerooms were broken and the storeroom flooded causing damage to the equipment and electrical circuits.				
Nov. , 1972 Grounding	In Port	As ARQUIMEDES, Panamanian flag, grounded in a Chilean port and subsequently put into San Juan, Puerto Rico with engine trouble that was apparently related to the grounding. Two months after the grounding the vessel was drydocked in Havre, France. No details of grounding and/or engine damages were provided.				
Aug. 11, 1976 Hit Dock Wall	In Port	As PYTHAGORE, contacted drydock wall at St. Nazaire, France. Starboard quarter plating was set in 3 places and 2 frames and 1 web frame bent, in engine room. Repairs were deferred.				
June 22, 1978 Heavy Weather Damages	At Sea	As PYTHAGORE, reported drydocked at St. Nazaire, France, September 18, with heavy weather damages sustained in June. Forecastle bulwark plating indented over 5 meters and bilge keel to renew over 6 meters. Main engine forward turbocharger casing cracked over 30 cm. Noted leak of circulation water.				

(Casualties cont'd on next page)

REPORTED CASUALTIES TO LIQUEFIED GAS CARRIERS ABOVE 5000 CBM

VESSEL NAME		CUBIC METERS	FLAG	OWNERS	YEAR BUILT	TANK TYPE: TEMP. C
PYTHAGORE cont'd						
Jan. 1980 Hit Bottom, Grounded	At Sea	Ran aground in Aegean after clearing Dardanelles December 28 on loaded voyage from Odessa to U.S. Starboard bottom shell plating, strakes and internals were affected. Repairs completed at St. Nazaire April 8.				
RIBAGORCA		46,720	Panamanian	Trans-Offshore	1966	R-41
Feb. 16, 1966 Fire in Building Yard	In Port	As BRIDGESTONE MARU III, Japanese flag, at fitting out yard at Nagoya, Japan about 1 month before delivery, fire in No. 3 tank, insulation burnt, deck plating damaged. Fifteen dock workers killed and others gassed. The fire in the polyurethane insulation suffocated the workers.				
April 27, 1981 Stranded in River	River Plate	As RIBAGORCA, enroute from Buenos Aires to Montevideo, reported stranded in the River Plate on April 27, 1981. Proceeded on voyage. Scuffing of paintwork on bottom starboard side. Propeller has some cavitation marks.				
SANDRINA		53,400	Panamanian	Gatoil International	1973	R-48
Feb. 21, 1974	At Sea	As PROVIDENCE MULTINA, French flag, enroute Ras Tanura, Saudi Arabia to Spain, vessel reported main engine breakdown off Cape Agulhas, South Africa lat. 35 01S, long. 20 20E, drifting north at one mile per hour. Vessel expects restart engine in 3-1/2 hours. Five days later report that vessel proceeded under own power. No indication of when engine restarted.				

(Casualties cont'd on next page)

REPORTED CASUALTIES TO LIQUEFIED GAS CARRIERS ABOVE 5000 CBM

VESSEL NAME		CUBIC METERS	FLAG	OWNERS	YEAR BUILT	TANK TYPE: TEMP. C
SANDRINA cont'd						
Sept. 6, 1979 Lightening Damage	In Port	As ATLANTE, French flag, at Zone A, River Plate Estuary, Argentina, while approached by LPG tanker LINCOLNSHIRE for lightening, reported contact with other vessel, both sustaining damage. No other details.				
SANT JORDI		5,000	Spanish	Nav. de Productos Licuados S.A.	1977	I-165
Jan. 8, 1980 Collision, Light Damage	In Port	In collision Flushing Roads, Netherlands, with tanker GEROI KERCHI. Light damages sustained by SANT JORDI. No other details.				
SARRAT		13,196	Philippine	Manila Gas Corp.	1963	S-5
Dec. 4, 1976 Weather Damage	At Sea	As CRYSTAL, Liberian flag, Tees for US, loaded, sustained heavy weather and came to Brest Roads, France, as port of refuge for repairs. Left Brest 17 days later for Havre, to transship cargo to another gas carrier, FERNBANK. The CRYSTAL sailed for Havre 45 days later. No details of damages.				
March 4, 1981 Lost Anchor	In Port	As SARRAT, reported lost anchor at Coatzacoalcos on March 3, 1981. Subsequently arrived Cayman Brac March 9, 1981 from Tampico.				

(Casualties cont'd on next page)

REPORTED CASUALTIES TO LIQUEFIED GAS CARRIERS ABOVE 5000 CBM

VESSEL NAME		CUBIC METERS	FLAG	OWNERS	YEAR BUILT	TANK TYPE: TEMP. C
TATSUNO MARU		50,670	Japanese	Nippon Yusen Kaisha	1967	R-45
Aug. 6, 1971 Fire in Shipyard, 5 Dead	In Port	During annual drydocking at Yokohama, a fire broke out in No. 4 tank due to welding and lasted about one hour. Five dockyard employees were killed. No mention of any damage to the vessel.				
Feb. 26, 1981 Contact Fixed Object	At Sea	Contacted fixed object off Venezuela on February 26, 1981. Repairs deferred.				
TOYOSU		13,145	Panamanian	Tanker Leasing Corp.	1945 Rebuilt: 1977	R-47
Nov. 29, 1966 Lost Propeller Blade	At Sea	Enroute Tokyo for Bombay, when approximately 300 miles off Bombay, severe bump and vibration felt, which necessitated slowing down. One blade of propeller missing, probably due striking sunken country craft or drifting logs as a result of severe cyclonic storm on west coast of India at end of November. Surveyor found one blade sheared off 6 in. from boss probably due to flaw or small previous fracture.				
VASCO DA GAMA		6,100	Norwegian	A.I. Langfeldts Rederi	1976	S-104
Feb. 26, 1979 Collision	In Port	Collided with GAROUFALIA in Flushing Roads, Netherlands, while in ballast with about 12 tons ethylene gas remaining in all four tanks. Dense fog at time of collision. Both anchored for inspection of damage. Other vessel sustained heavy damage on forepeak. Gas carrier port side plating heavily torn open over 6 meters extending below water level in way of No. 3 hold space. No. 3 space open to sea and flooded. Diesel tank open and 60 tons of diesel lost.				

(Casualties cont'd on next page)

REPORTED CASUALTIES TO LIQUEFIED GAS CARRIERS ABOVE 5000 CBM

VESSEL NAME		CUBIC METERS	FLAG	OWNERS	YEAR BUILT	TANK TYPE: TEMP. C
VASCO DA GAMA cont'd						
July 19, 1979 Breakdown Due Electrical Failure	At Sea	While enroute Tarragona, Spain to Terneuzen, Netherlands, had engine trouble due to electricity failure about 10-20 miles off the Minquiers Islands in English Channel. Vessel in ballast. Tug attended and put compressor aboard to start engine. Drifted for 16 hours without power then resumed voyage.				
WILLIAM R. GRACE		12,975	Liberian	Oswego Chemical Carriers	1964	R-45
June 20, 1965 Grounded at Berth	In Port	Grounded alongside the berth at Guanica, Puerto Rico, sustaining bottom damages. Three bottom plates were renewed, five plates were part renewed and 2 plates required fairing in place plus straightening of affected internals.				
May 27, 1970 Weather Damage	At Sea	Vessel reported minor damage to port lifeboat and one davit. The damage was repaired at Port of Spain, Trinidad. Damage was probably due to weather.				
June 4, 1970 Touched Bottom	?	Vessel reported touching bottom but location of incident not stated. In October 1971 the vessel was surveyed in drydock at Frederikshavn, Denmark, but no damage was found due to touching bottom.				
Jan. 20, 1971 Explosion Main Engine	At Sea	Enroute Shell Haven, London to Trinidad, in ballast, an explosion in the main engine damaged the exhaust trucking and scavenge coolers. Repairs were made at Trinidad.				
March 11-13, 1973 Weather Damages	At Sea	Enroute River Thames, U.K. to Aruba, N.A., encountered heavy weather and sustained some damage. In Jacksonville, Fla. in May 1973, the vessel was surveyed for the damages. No details were provided of the damages, if any.				

(Casualties cont'd on next page)

REPORTED CASUALTIES TO LIQUEFIED GAS CARRIERS ABOVE 5000 CBM

VESSEL NAME	CUBIC METERS	FLAG	OWNERS	YEAR BUILT	TANK TYPE: TEMP. C
WILLIAM R. GRACE cont'd					
Dec. 21, 1977 At Sea Weather Damages	At Port of Spain, Trinidad, vessel reported davit damage due heavy weather. No other details provided.				
Jan. 3, 1978 In Port Machinery Damage	At Trinidad reported machinery damage. No other details provided.				
March 16, 1979 In Port Lost Power & Steering and Grounded in Seine	While departing Rouen, France, in ballast, with pilot aboard, vessel blacked out and lost steering in River Seine. Shortly after, grounded on stern. Power was restored and the vessel refloated by means of her anchors and proceeded to Havre for inspection. Rudder stock was twisted to starboard about 20 degrees. Proceeded to Rotterdam with tug escort for repairs. Vessel was stranded for less than 2 hours.				
Nov. 23, 1981 At Sea Auxiliary Generator Damage	Sustained auxiliary generator damage during voyage from Avonmouth to Port of Spain on November 23, 1981. Survey requested. Port auxiliary diesel engine crankshaft journals scored.				
WILTSHIRE	15,495	British	Bibby Transport Ltd.	1968	R-50
Feb., 1972 At Sea Weather Damaged	Enroute Cobh, Ireland, for United States, encountered heavy weather and put into St. Michaels, Azores, for overnight. At Donaldsonville, LA, divers reported a fracture in the bottom plating.				
May 1979 At Sea Hit Submerged Object and Lost Propeller Blade	Enroute Falmouth, England, for Brazil, contacted a submerged object and lost propeller blade. Put in Ferrol, Spain, for repairs and departed 32 days later.				

(Casualties cont'd on next page)

REPORTED CASUALTIES TO LIQUEFIED GAS CARRIERS ABOVE 5000 CBM

VESSEL NAME	CUBIC METERS	FLAG	OWNERS	YEAR BUILT	TANK TYPE: TEMP. C
WORLD BRIDGESTONE	74,442	Panamanian	Credo Shipping Co. S.A.I.	1971	R-46
Mar. 28, 1973 At Sea Collision	Enroute Mena al Ahmadi, Kuwait to Japan, loaded with LPG, was in collision with tanker MARYLAND TRADER at North end of Malacca Strait. The gas carrier sustained a crack in the shell plating port side No. 1 and damage way No. 5 hold. Both affected tanks were loaded with butane. The other tanks in the gas carrier were full of liquid propane. Weather deck plating severely damaged above No. hold fuel bunker tank. Void space in No. 1 hold around cargo tank flooded after collision due fractured shell plating below water line. Both vessels put in Singapore for temporary repairs. Gas carrier left Singapore after temporary repairs were completed and proceeded to Japan for discharge and permanent repairs.				
YUYO MARU NO.10	47,424	Japanese	Yuyo Kaiun K.K.	1966	R-46
Nov. 9, 1974 In Port Collision; TOTAL LOSS	Enroute Ras Tanura, Saudi Arabia for Kawasaki, Japan, with a cargo of propane, butane and naphtha, collided with motor bulk carrier PACIFIC ARES off Yokohama harbor, both on fire. A huge explosion ripped through the hull of the gas carrier about three hours after collision. Fifteen firefighting and rescue vessels had been warned to stay away from the gas carrier for fear of an explosion. Twenty-nine seamen from the bulk carrier and 5 from the gas carrier were confirmed dead. Later in the day the gas carrier was towed by two tugs and ran aground off Futtsu Point, where she continued burning. The gas carrier continued burning for a week. Nineteen days after the collision, still afire, the gas carrier was towed 300 miles east of Tokyo and sunk by Japanese Armed Forces. The master of both vessels were charged with suspicion of causing unintentional manslaughter and injuries. Master of bulk carrier was killed by the incident. (The damage was found under investigation to have been caused by the naphtha fire.) Total Loss.				